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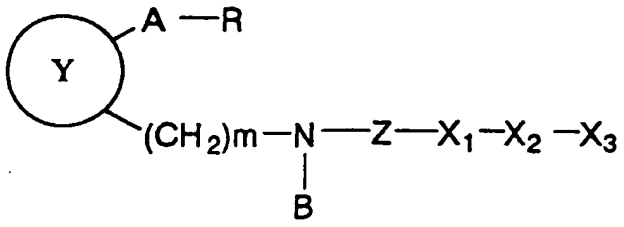
(54) BICYCLIC AMINO DERIVATIVES AND PGD 2 ANTAGONIST CONTAINING THE SAME

(57) A compound of the formula (I):



(I)

wherein

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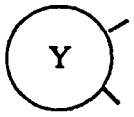
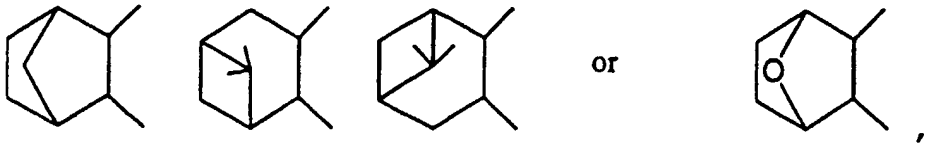
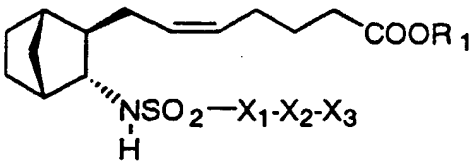


is

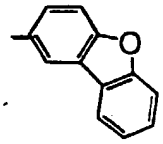


for example, a compound below:



wherein

R_1 is CH_3, H or Na; and X1-X2-X3 is



or a salt or a hydrate thereof is useful as a PGD_2 antagonist and can be used as a drug for treating diseases in which mast cell dysfunction is involved, for example, systemic mastocytosis and disorder of systemic mast cell activation, and also tracheal contraction, asthma, allergic rhinitis, allergic conjunctivitis, urticaria, injury due to ischemic reperfusion, and as an anti-inflammatory agent. It is particularly useful in the treatment of nasal occlusion.

Description

FIELD OF THE INVENTION

The present invention relates to bicyclic amino derivatives and prostaglandin D_2 (hereinafter, referred to as PGD_2) antagonist containing them.

BACKGROUND OF THE INVENTION

Some bicyclic amino derivatives of the present invention are known to be useful as thromboxane A_2 (TXA_2) antagonists (Japanese Patent Publication (KOKOKU) No. 79060/1993). However, Japanese Patent Publication (KOKOKU) No. 79060/1993 only describes the compounds as useful as TXA_2 antagonists, and does not suggest usefulness thereof as PGD_2 antagonists as disclosed by the present invention.

Namely, TXA_2 is known to have activities such as action against platelet agglutination, thrombogenesis, etc. The TXA_2 antagonist has therefore been considered to be useful as an anti-thrombotic agent, and also in the treatment of myocardial infarction or asthma by antagonizing against TXA_2.

On the other hand, the PGD_2 antagonist of the present invention is useful in the improvement of conditions due to excessive production of PGD_2. Specifically, it is useful as a drug for treating diseases in which mast cell dysfunction is involved, for example, systemic mastocytosis and disorder of systemic mast cell activation, and also tracheal contraction, asthma, allergic rhinitis, allergic conjunctivitis, urticaria, injury due to ischemic reperfusion, and inflammation.

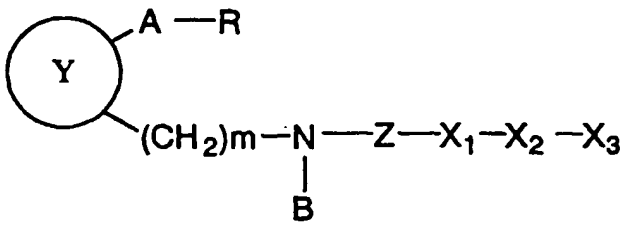
As is apparent from the above, the TXA_2 antagonist and the PGD_2 antagonist are completely different from each other in terms of the active site, mechanism of action, and application, and have quite different characteristics. Accordingly, it has never been expected that any compound could possess these activities simultaneously.

PGD_2 is produced through PGG_2 and PGH_2 from arachidonic acid by the action of cyclooxygenase activated by immunological or unimmunological stimulation and is the major prostanoid that is produced and released from mast cells. PGD_2 has various potent physiological and pathological activities. For example, PGD_2 can cause strong tracheal contraction, which leads to bronchial asthma, and, in a systemic allergic state, it can dilate the peripheral vessels, which leads to an anaphylactic shock. Especially, much attention has been paid to the idea that PGD_2 is one of the causal substances responsible for the onset of nasal occlusion in the allergic rhinitis. Therefore, it has been proposed to develop an inhibitor against the biosynthesis of PGD_2 or an antagonist of PGD_2 receptor as a drug for the reduction of nasal occlusion. However, the inhibitor of PGD_2 biosynthesis possibly affects greatly the synthesis of prostaglandins in other organisms, and therefore, it is desirable to develop an antagonist (blocker) specific to PGD_2 receptor.

DISCLOSURE OF THE INVENTION

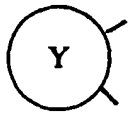
The present inventors have studied intensively to develop PGD_2 receptor antagonists (blockers) specific to PGD_2 receptor, and found that compounds of the formula (I) below or its salt possess a potent activity as PGD_2 receptor antagonists and are chemically and biochemically stable.

Accordingly, the present invention provides a PGD_2 antagonist which comprises a compound of the general formula (I) below or its salt or a hydrate thereof as an active ingredient:



(I)

wherein



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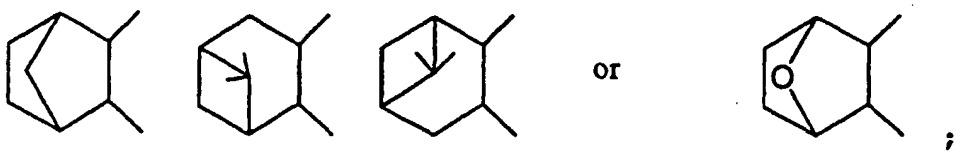


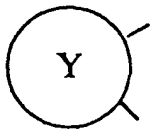
;

A is alkylene which optionally is intervened by a hetero atom or phenylene, contains oxo group, and/or has an unsaturated bond;
B is hydrogen, alkyl, aralkyl or acyl;
R is $COOR_1$, CH_2OR_2 or $CON(R_3)R_4$;
R_1 is hydrogen or alkyl;
R_2 is hydrogen or alkyl;
R_3 and R_4 each are independently hydrogen, alkyl, hydroxy or alkylsulfonyl;
X_1 is a single bond, phenylene, naphthylene, thiophenediyl, indolediyl, or oxazolediyl;
X_2 is a single bond, -N=N-, -N=CH-, -CH=N-, -CH=N-N-, -CH=N-O-, -C=NNHCSNH-, -C=NNHCONH-, -CH=CH-, -CH(OH)-, -C(Cl)=C(Cl)-, - (CH_2)n-, ethynylene, $-N(R_5)-$, $-N(R_{51})CO-$, $-N(R_{52})SO_2-$, - $N(R_{53})CON(R_{54})-$, - $CON(R_{55})-$ $-SO_2N(R_{56})-$, -O-, -S-, -SO-, $-SO_2-$, -CO-, oxadiazolediyl, thiadiazolediyl or tetrazolediyl;
X_3 is alkyl, alkenyl, alkynyl, aryl, aralkyl, heterocyclic group, cycloalkyl, cycloalkenyl, thiazolinylidenemethyl, thiazolidinylidenemethyl, $-CH=NR_6$ or $-N=C(R_7)R_8$;
R_5, R_{51}, R_{52}, R_{53}, R_{54}, R_{55} and R_{56} each are hydrogen or alkyl;
R_6 is hydrogen, alkyl, hydroxy, alkoxy, carbamoyloxy, thiocarbamoyloxy, ureido or thioureido;
R_7 and R_8 each are independently alkyl, alkoxy or aryl;
n is 1 or 2;
Z is $-SO_2-$ or -CO-; and
m is 0 or 1;

wherein a cyclic substituent may have one to three substituents selected from the group consisting of nitro, alkoxy, sulfamoyl, substituted- or unsubstituted-amino, acyl, acyloxy, hydroxy, halogen, alkyl, alkynyl, carboxy, alkoxycarbonyl, aralkoxycarbonyl, aryloxycarbonyl, mesyloxy, cyano, alkenyloxy, hydroxyalkyl, trifluoromethyl, alkylthio, $-N=PPh_3$, oxo, thioxo, hydroxyimino, alkoxyimino, phenyl and alkylenedioxy.

THE BEST EMBODIMENT FOR PRACTICING THE INVENTION

Specific examples of compounds usable as a PGD_2 antagonist above include a compound of the formula (I) wherein



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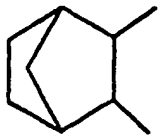
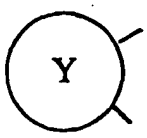


;

m is 0; and when Z is SO_2, both X_1 and X_2 are a single bond; X_3 is alkyl, phenyl, naphthyl, stylyl, quinolyl or thienyl; and a cyclic substituent among these substituents optionally has one to three substituents selected from the group consisting of nitro, alkoxy, substituted- or unsubstituted-amino, halogen, alkyl and hydroxyalkyl, or a salt or hydrate thereof.

Similarly, specific examples include a compound of the formula (I) wherein



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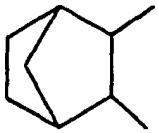
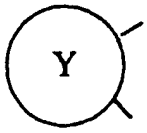


;

when m is 1, both X_1 and X_2 are a single bond; and X_3 is phenyl optionally substituted with halogen, or a salt or hydrate thereof.

Similarly, specific examples include a compound of the formula (I) wherein



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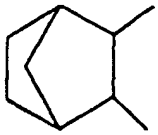
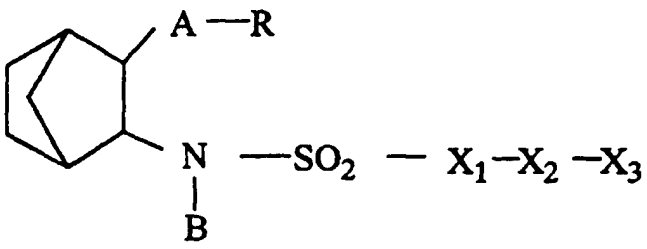


;

when m is 1, X_1 is phenyl, X_2 is $-CH_2-$ or -N=N- and X_3 is phenyl, or a salt or hydrate thereof.

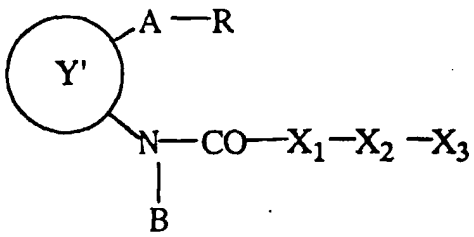
Similarly, examples of compounds of the formula (I) include those of the formula (Ia):



(Ia)

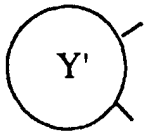
wherein A, B, R, X_1, X_2 and X_3 are as defined above, or its salt or hydrate thereof, provided that those wherein (1) X_1 and X_2 are a single bond, and X_3 is substituted- or unsubstituted-phenyl, or naphthyl; and (2) A is 5-heptenylene, R is $COOR_1$ (R_1 is hydrogen or methyl), X_1 is 1,4-phenylene, X_2 is a single bond, and X_3 is phenyl are excluded.

Similarly, examples of compounds of the formula (I) include those of the formula (Ib):



(Ib)

wherein



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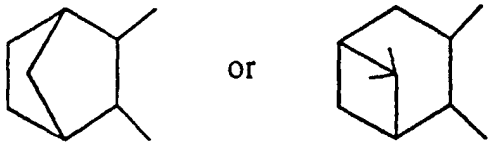


;

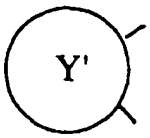
A, B, R, X_1, X_2 and X_3 are as defined above, or a salt or hydrate thereof, provided that those wherein X_1 and X_2 are a single bond, and X_3 is phenyl, and wherein X_1 is a single bond, X_2 is -O-, and X_3 is benzyl are excluded.

More specifically, examples of compounds of the formula (I) include those of the formula (Ia) wherein X_1 and X_2 are a single bond, X_3 is isoxazolyl, thiadiazolyl, isothiazolyl, morpholyl, indolyl, benzofuryl, dibenzofuryl, dibenzodioxinyl, benzothienyl, dibenzothienyl, carbazolyl, xanthenyl, phenanthridinyl, dibenzoxepinyl, dibenzothiepinyl, cinnolyl, chromenyl, benzimidazolyl or dihydrobenzothiepinyl, or its salt or hydrate thereof.

Similarly, examples of compounds of the formula (I) include those of the formula (Ia) wherein X_1 is a single bond, X_2 is phenylene, X_3 is alkenyl, alkynyl, $-CH=NR_6$ or $-N=C(R_7)R_8$, or a salt or hydrate thereof.

Similarly, examples of compounds of the formula (I) include those of the formula (Ia) wherein R is $COOR_1$, X_1 is phenylene or thiophenediyl, X_2 is a single bond, -N=H-, -CH=CH-, -CONH-, - NHCO- or ethynylene and X_3 is phenyl, thiazolinylidenemethyl, thiazolidinylidenemethyl or thienyl, or a salt or hydrate thereof.

More specifically, examples of the compound (I) of the present invention include those of the formula (Ib) wherein



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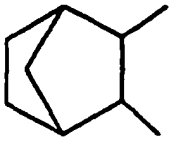
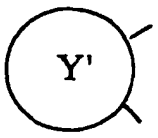


;

or a salt or hydrate thereof. Examples of more preferred compounds include those of the formula (Ib) wherein R is $COOR_1$ (R_1 is as defined above) or a salt or hydrate thereof.

Similarly, examples of compound (I) include those of the formula (Ib) wherein X_1 is phenylene or thiophenediyl, X_2 is a single bond, -N=H-, -CH=CH-, ethynylene, -O-, -S-, -CO-, -CON(R_{55})- (R_{55} is as defined above), -N(R_{51})CO- (R_{51} is as defined above) and X_3 is phenyl, or a salt or hydrate thereof.

More specifically, examples of compound (I) include those of the formula (Ib) wherein



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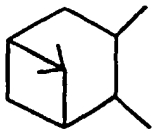


,

or a salt or hydrate thereof. Examples of more preferred embodiments include those wherein B is hydrogen, both X_1 and X_2 are a single bond, X_3 is thienyl, thiazolyl, thiadiazolyl, isothiazolyl, pyrrolyl, pyridyl, benzofuryl, benzimidazolyl, benzothienyl, dibenzofuryl, dibenzothienyl, quinolyl or indolyl or a salt or hydrate thereof. Similarly, examples include those wherein X_1 is phenylene, thiophenediyl, indolediyl or oxazolediyl, X_2 is a single bond, -N=H-, -CH=CH-, ethynylene, -S- or -O-, and X_3 is aryl or heterocyclic group, or a salt or hydrate thereof.

The compounds of the general formula (Ia) and (Ib) are novel compounds synthesized by the present inventors.

The terms used throughout the present specification are as defined below.

The term "alkylene" means C_1 - C_9 straight or branched chain alkylene, for example, methylene, methylmethylene, dimethylmethylene, methylethylmethylene, ethylene, trimethylene, tetramethylene, pentamethylene, hexamethylene, heptamethylene, octamethyene, nonamethylene , or the like. The alkylene above can be intervened by a hetero atom(s) (oxygen, sulfur, nitrogen atom, or the like) or phenylene (e.g., 1,4-phenylene, 1,3-phenylene, 1,2-phenylene, or the like), contain an oxo group, and/or have one or more double- or triple-bonds at any positions on the chain. Examples include -$(CH_2)_2$-O-CH_2-, -$(CH_2)_2$-O-$(CH_2)_2$-, -$(CH_2)_2$-O-$(CH_2)_3$-, -$(CH_2)_2$-O-$(CH_2)_4$-, -$(CH_2)_2$-O-$(CH_2)_5$-, -$(CH_2)_2$-O-$(CH_2)_6$-, -$(CH_2)_2$-S-$(CH_2)_2$-, -$(CH_2)_3$-S-$(CH_2)_2$-, -CH_2-S-CH_2-, -CH_2-S-$(CH_2)_4$-, -CH_2-N(CH_3)-CH_2-, -CH_2-NH-$(CH_2)_2$-, -$(CH_2)_2$-N(CH_2CH_3)-$(CH_2)_3$-, -$(CH_2)_2$-1,4-phenylene-CH_2-, -$(CH_2)_2$-O-1,3-phenylene-CH_2-, -$(CH_2)_2$-O-1,2-phenylene-CH_2-, -$(CH_2)_2$-O-1,4-phenylene-CH_2-, -CH=CH-S-CH_2-1,4-phenylene-CH_2-, -CH=CH-S-1,3-phenylene-$(CH_2)_2$-, 2-oxopropylene, 3-oxopentylene, 5-oxohexylene, vinylene, 1-propenylene, 2-propenylene, 1-butenylene, 2-butenylene, 3-bute-

nylene, 1,2-butadienylene, 1,3-butadienylene, 1-pentenylene, 2-pentenylene, 3-pentenylene, 4-pentenylene, 1,2-pentadienylene, 1,3-pentadienylene, 1,4-pentadienylene, 2,3-pentadienylene, 2,4-pentadienylene, 1-hexyenylene, 2-hexenylene, 3-hexenylene, 4-hexenylene, 5-hexenylene, 1,2-hexadienylene, 1,3-hexadienylene 1,4-hexadienylene, 1,5-hexadienylene, 2,3-hexadienylene, 2,4-hexadienylene 2,5-hexadienylene, 3,4-hexadienylene, 3,5-hexadienylene, 4,5-hexadienylen, 1,1-dimethyl-4-hexenylen, 1-heptenylene, 2-heptenylene, 3-heptenylene, 4-heptenylene, 5-heptenylene, 2,2-dimethyl-5-heptenylene, 6-heptenylene, 1,2-heptadienylne, 1,3-heptadienylene, 1,4-heptadienylene, 1,5-heptadienylene, 1,6-heptadienylene, 2,3-heptadienylene, 2,4-heptadienylene, 2,5-heptadienylene, 2,6-heptadienylene, 3,4-heptadienylene, 3,5-heptadienylene, 3,6-heptadienylene, 4,5-heptadienylene, 4,6-heptadienylene or 5,6-heptadienylene, 1-propynylene, 3-butynylene, 2-pentynylene, 5-hexynylene, 6-heptynylene, $-(CH_2)-CH=CH-O-(CH_2)_2-$, $-CH_2-S-(CH_2)_3-$, $-CH_2$-cis-CH=CH-1,2-phenylene-CH_2-, -CH=CH-1,4-phenylene-$(CH_2)_2-$, -4-oxo-4,5-hexenylene-, and the like.

The term "alkyl" means C_1 - C_{20} straight or branched chain alkyl, for example, methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, s-butyl, t-butyl, n-pentyl, i-pentyl, neopentyl, t-pentyl, hexyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, octadecyl, nonadecyl, icosyl, and the like.

The term "aryl" means C_6 - C_{14} monocyclic or condensed ring, for example, phenyl, naphthyl (e.g., 1-naphthyl, 2-naphtyl), anthryl (e.g., 1-anthryl, 2-anthryl, 9-anthryl), phenanthryl (e.g., 2-phenanthryl, 3-phenanthryl, 9-phenanthryl), fluorenyl (e.g., 2-fluorenyl), and the like. Phenyl is especially preferred.

The term "aralkyl" means a group formed by substituting an alkyl as defined above with an aryl above at any substitutable positions on the alkyl. Examples include benzyl, phenethyl, phenylpropyl (e.g., 3-phenylpropyl), naphtylmethyl (e.g., α-naphtylmethyl), anthrylmethyl (e.g., 9-anthrylmethy), phenanthrylmethyl (e.g., 3-phenanthrylmethyl), and the like.

The term "acyl" means C_1 - C_9 acyl derived from aliphatic carboxylic acid, for example, formyl, acetyl, propionyl, butyryl, valeryl, and the like.

The term "alkylsulfonyl" means a group formed by substituting a sulfonyl with an alkyl above, for example, methylsulfonyl, ethylsulfonyl, propylsulfonyl, and the like.

The term "alkenyl" is C_2 - C_{20} straight or branched chain alkenyl, which corresponds to an alkyl above containing one or more double bonds. Examples include vinyl, 1-propenyl, 2-propenyl, 1-butenyl, 2-butenyl, 3-butenyl, 1,2-butadienyl, 1-pentenyl, 1,2-pentadienyl, 2-hexyenyl, 1,2-hexadienyl, 3-heptenyl, 1,5-heptadienyl, and the like.

The term "alkynyl" is C_2 - C_{20} straight or branched chain, alkynyl, which corresponds to an alkyl above containing one or more triple bonds. Examples include ethynyl, 1-propynyl, 2-propynyl, 1-butynyl, 2-butynyl, 3-butynyl, and the like.

The term "heterocyclic group" means 5 - 7 membered cyclic group containing one or more hetero atoms selected independently from the group consisting of oxygen, sulfur and/or nitrogen atom on the ring, and is optionally condensed with a carbon ring or other heterocyclic group at any substitutable positions. Examples include pyrrolyl (e.g., 1-pyrrolyl, 3-pyrrolyl), indolyl (e.g., 2-indolyl, 3-indolyl, 6-indolyl), carbazolyl (e.g., 2-carbazolyl, 3-carbazolyl), imidazolyl (e.g., 1-imidazolyl, 4-imidazolyl), pyrazolyl (e.g., 1-pyrazolyl, 3-pyrazolyl), benzimidazolyl (e.g., 2-benzimidazolyl, 5-benzimidazolyl), indazolyl (e.g., 3-indazolyl), indolizinyl (e.g., 6-indolyzinyl), pyridyl (e.g., 2-pyridyl, 3-pyridyl, 4-pyridyl), quinolyl (e.g., 8-quinolyl), isoquinolyl (e.g., 3-isoquinolyl), acridyl (e.g., 1-acridyl), phenanthrydinyl (e.g., 2-phenanthrydinyl, 3-phenanthrydinyl), pyridazinyl (e.g., 3-pydidazinyl), pyrimidinyl (e.g., 4-pyrimidinyl), pyrazinyl (e.g., 2-pyrazinyl), cinnolinyl (e.g., 3-cinnolinyl), phthaladinyl (e.g., 5-phthaladinyl), quinazolinyl (e.g., 2-quinazolinyl), isoxazolyl (e.g., 3-isoxazolyl, 4-isoxazolyl), benzisoxazolyl (e.g., 1,2-benzisoxazol-4-yl, 2,1-benzisoxazol-3-yl), oxazolyl (e.g., 2-oxazolyl, 4-oxazolyl, 5-oxazolyl), benzoxazolyl (e.g., 2-benzoxazolyl), benzoxadiazolyl (e.g., 4-benzoxadiazolyl), isothiazolyl (e.g., 3-isothiazolyl, 4-isothiazolyl) benzisothiazolyl (e.g., 1,2-benzisothiazol-3-yl, 2,1-benzisothizol-5-yl), thiazolyl (e.g., 2-thiazolyl), benzothiazolyl (e.g., 2-benzothiazolyl), thiadiazolyl (e.g., 1,2,3-thiadiazol-4-yl), oxadiazolyl (e.g., 1,3,4-oxadiazol-2-yl), dihydroxadiazolyl (e.g., 4,5-dihydro-1,2,4-oxadiazol-3-yl), furyl (e.g., 2-furyl, 3-furyl), benzofuryl (e.g., 3-benzofuryl), isobenzofuryl (e.g., 1-isobenzofuryl), thienyl (e.g., 2-thienyl, 3-thienyl), benzothienyl (1-benzothiophen-2-yl, 2-benzothiophen-1-yl), tetrazolyl (e.g., 5-tetrazolyl), benzodioxolyl (e.g., 1,3-benzodioxol-5-yl), dibenzofuryl (e.g., 2-dibenzofuryl, 3-dibenzofuryl), dibenzoxepinyl (e.g., dibenz[b,f]oxepin-2-yl), dihydrodibenzoxepinyl (e.g., dihydrodibenz[b,f]oxepin-2-yl, chromenyl (e.g., 2H-chromen-3-yl, 4H-chromen-2-yl), dibenzothiepinyl (e.g., dibenzo[b,f]thiepin-3-yl, dihydrodibenzo[b,f]thiepin-3-yl), morpholinyl (e.g., 1,4-morpholin-4-yl), phenothiadinyl (2-phenothiadinyl), cyclopentathienyl (e.g., cyclopenta[b]thiophen-3-yl), cyclohexathienyl (e.g., cyclohexa[b]thiophen-3-yl), and the like.

The term "cycloalkyl" means C_3 - C_8 cyclic alkyl, for example, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, and the like.

The term "cycloalkenyl" means C_3 - C_8 cyclic alkenyl, for example, cyclopropenyl (e.g., 1-cyclopropenyl), cyclobutenyl (e.g., 2-cyclobuten-1-yl), cyclopentenyl (1-cyclopenten-1-yl), cyclohexenyl (1-cyclohexen-1-yl), and the like.

The term "alkoxy" means C_1 - C_6 alkoxy, for example, methoxy, ethoxy, n-propoxy, i-propoxy, n-butoxy, and the like.

Examples of the substituted amino in the definition of "substituted- or un-substituted-amino" include mono- or di-substituted amino such as methylamino, ethylamino, dimethylamino, cyclohexylamino, phenylamino, diphenylamino, or

cyclic amino such as piperidino, piperadino or morpholino.

The term "acyloxy" means an acyloxy derived from the "acyl" above, for example, acetyloxy, propionyloxy, butyryloxy, valeryloxy, and the like.

The term "halogen" means fluorine, chlorine, bromine and iodine.

The term "alkoxycarbonyl" means an alkoxycarbonyl group derived from the "alkoxy" above, for example, methoxycarbonyl, ethoxycarbonyl, phenyloxycarbonyl, and the like.

The term "aralkyloxycarbonyl" means an aralkyloxycarbonyl group derived from the "aralkyl" above, for example, benzyloxycarbonyl, phenethyloxycarbonyl, and the like.

The term "aryloxycarbonyl" means an aryloxycarbonyl group derived from the "aryl" above, for example, phenyloxycarbonyl, naphtyloxycarbonyl, and the like.

The term "alkenyloxy" means an alkenyloxy group derived from the "alkenyl" above, for example, vinyloxy, 1-propenyloxy, 2-butenyloxy, and the like.

The term "hydroxyalkyl" means a hydroxyalkyl group derived from the "alkyl" above, for example, hydroxymethyl, hydroxyethyl, hydroxypropyl, and the like.

The term "alkylthio" means an alkylthio group derived from the "alkyl" above, for example, methylthio, ethylthio, propylthio, and the like.

The term "alkylenedioxy" means C_1 - C_3 alkylenedioxy, for example, methylenedioxy, ethylenedioxy, propylenedioxy, and the like.

In the case of "phenylene, "naphthylene", "thiophenediyl", "indolediyl", "oxazolediyl", "oxadiazolediyl" and tetrazolediyl", the said group can bind to the neighboring groups at any two substitutable sites.

In the definitions above, when a substituent(s) is cyclic, it may be substituted by one to three substituents selected from nitro, alkoxy, sulfamoyl, substituted- or un-substituted-amino, acyl, acyloxy, hydroxy, halogen, alkyl, alkynyl, carboxy, alkoxycarbonyl, aralkoxycarbonyl, aryloxycarbonyl, mesyloxy, cyano, alkenyloxy, hydroxyalkyl, trifluoromethyl, alkylthio, - $N=PPh_3$, oxo, thioxo, hydroxyimino, alkoxyimino, phenyl and alkylenedioxy. The substituent(s) may bind to any substitutable positions on the ring.

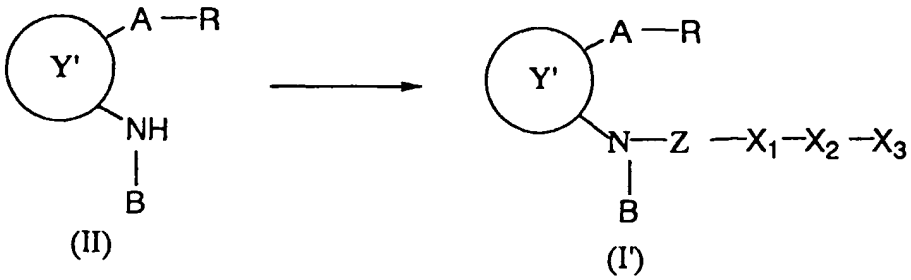
Examples of salts of the compound (I) include those formed with an alkali metal (e.g., lithium, sodium or potassium), an alkaline earth metal (e.g., calcium), an organic base (e.g., tromethamine, trimethylamine, triethylamine, 2-aminobutane, t-butylamine, diisopropylethylamine, n-butylmethylamine, cyclohexylamine, dicyclohexylamine, N-isopropylcyclohexylamine, furfurylamine, benzylamine, methylbenzylamine, dibenzylamine, N,N-dimethylbenzylamine, 2-chlorobenzylamine, 4-methoxybenzylamine, 1-naphthylenemethylamine, diphenylbenzylamine, triphenylamine, 1-naphthylamine, 1-aminoanthoracene, 2-aminoanthoracene, dehydroabiethylamine, N-methylmorpholine or pyridine), an amino acid (e.g., lysine, or arginine), and the like.

The term "hydrate" means a hydrate of the compound of the formula (I) or its salt. Examples include mono- and dihydrates.

The present compounds are shown by the formula (I) and are inclusive of the form of any types of stereoisomers (e.g., diastereomer, epimer, enantiomer) and racemic compounds.

Among the compounds of the general formula (I), those wherein m=1, especially, those shown in Tables 3b and 3c below are known compounds described in Japanese Patent Publication (KOKAI) No. 180862/1990.

Among the compounds of the general formula (I), those wherein m=0, [i.e., those shown by the general formula (I')], can be prepared by reacting an amino compound of the general formula (II) with a reactive derivative of sulfonic acid or carboxylic acid corresponding to the partial structure: $Z\text{-}X_1\text{-}X_2\text{-}X_3$ as shown below.



Wherein A, B, R, X_1, X_2, X_3, Y and Z are as defined above.

A sulfonic acid corresponding to the partial structure: $Z\text{-}X_1\text{-}X_2\text{-}X_3$ is a compound of the general formula $X_3\text{-}X_2\text{-}X_1\text{-}SO_2OH$ and a carboxylic acid corresponding to the said partial structure is a compound of the general formula $X_3\text{-}X_2\text{-}X_1\text{-}COOH$. Reactive derivative of these sulfonic or carboxylic acids means a corresponding halide (e.g., chloride, bro-

mide, iodide), acid anhydride (e.g., mixed acid anhydride with formic acid or acetic acid), active ester (e.g., succinimide ester), and examples thereof generally include acylating agents used for the acylation of amino group. The carboxylic acid X_3-X_2-X_1-COOH can be used in the reaction as it is without converting into a reactive derivative, in the presence of a condensing agent (e.g., dicyclohexylcarbodiimide (DCC), 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide, N,N'-carbonyldiimidazole) which are used in the condensing reaction between amine and carboxylic acid.

The reaction can be conducted under the conditions generally used for the acylation of amino groups. For example, in the case of condensation using an acid halide, the reaction is carried out using a solvent such as an ether solvent (e.g., diethylether, tetrahydrofuran, dioxane), benzene solvent (e.g., benzene, toluene, xylene), halogenated hydrocarbon solvent (e.g., dichloromethane, dichloroethane, chloroform), ethyl acetate, dimethylformamide, dimethyl sulfoxide, acetonitrile, or the like, if necessary, in the presence of a base (e.g., organic base such as triethylamine, pyridine, N,N-dimethylaminopyridine, N-methylmorpholine; inorganic base such as sodium hydroxide, potassium hydroxide, potassium carbonate, or the like) under cooling, at room temperature or under heating, preferably at temperature ranging from -20°C to a temperature under cooling, or from room temperature to a refluxing temperature of the reaction system, for several min to several hr, preferably for 0.5 hr to 24 hr, more preferably, for 1 hr to 12 hr.

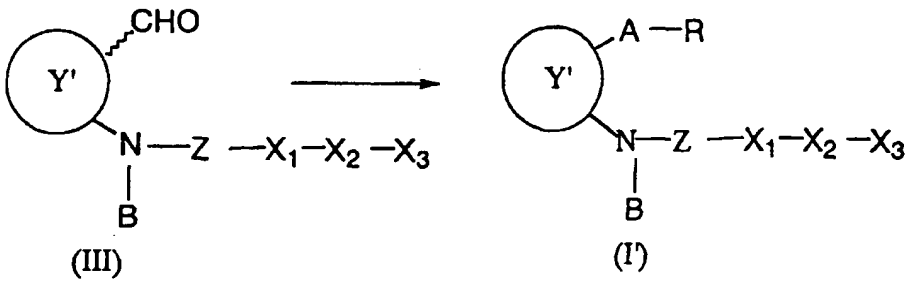
The reaction conditions for the reaction between other reactive derivative or a free acid and an amine (II) can be determined in a conventional manner depending on the characteristics of the respective reactive derivative or free acid.

The reaction product can be purified by conventional purification methods, for example, the extraction with a solvent, chromatography, recrystallization, or the like.

Specific examples of the compound (II) as a starting material for the present method are as follows. Examples of 3-amino[2.2.1]bicyclic compound include 7-(3-aminobicyclo[2.2.1]hept-2-yl)-5-heptenoic acid, 7-(3-aminobicyclo[2.2.1]hept-2-yl)-2,2-dimethyl-5-heptenoic acid, 7-(N-metnyl-3-aminobicyclo[2.2.1]hept-2-yl)-5-heptenoic acid, 6-(3-aminobicyclo[2.2.1]hept-2-yl)-5-hexenoic acid. Specific examples of 2-amino-6,6-dimethyl[3.1.1]bicyclic compound include 7-(2-amino-6,6-dimethylbicyclo[3.1.1]hept-3-yl)-5-heptenoic acid. In these starting compounds, the heptenoic acid chain may be saturated to form heptanoic acid chain, intervened by a hetero atom(s) or a hetero group(s) such as -O-, -S-, -NH-, or a phenylene(s), or substituted with an oxo group. Examples of such compounds include 7-(3-aminobicyclo[2.2.1]hept-2-yl)heptanoic acid, 4-[2-(2-aminobicyclo[3.1.1]hept-3-yl)ethoxyphenylacetic acid, 7-(3-aminobicyclo[2.2.1]hept-2-yl)-6-oxo-heptanoic acid. These starting compounds are either described in the Japanese Patent Publication (KOKOKU) No. 79060/1993 or 23170/1991, or can be prepared according to the method described therein.

Sulfonic acid X_3-X_2-X_1-SO_2OH and carboxylic acid X_3-X_2-X_1-COOH corresponding to the partial structure Z-X_1-X_2-X_3 mean a sulfonic acid or carboxylic acid having substituents corresponding to the Xs above. That is, examples include alkane-sulfonic acid or -carboxylic acid, alkene-sulfonic acid or -carboxylic acid, alkyne-sulfonic acid or -carboxylic acid, cycloalkane-sulfonic acid or -carboxylic acid, cycloalkene-sulfonic acid or -carboxylic acid, aryl-sulfonic acid or -carboxylic acid, aralkyloxy-sulfonic acid or -carboxylic acid, heterocyclic-substituted-sulfonic acid or -carboxylic acid, heteroarylalkyl-sulfonic acid or -carboxylic acid, and substituted-amino-sulfonic acid or -carboxylic acid. Each of sulfonic and carboxylic acids may have a substituent(s) above. These sulfonic acids and carboxylic acids are commercially available or can be easily synthesized from a known compound(s) in accordance with a known method. Upon reaction, the sulfonic or carboxylic acid can be converted into the corresponding reactive derivative above, if necessary. For example, when an acid halide is needed, the compound is reacted with thionyl halide (e.g., thionyl chloride), phosphorous halide (e.g., phosphorous trichloride, phosphorous pentachloride) or oxalyl halide (e.g., oxalyl chloride) in accordance with a known method such as those described in the literature (e.g., Shin-Jikken-Kagaku-Koza, vol. 14, pp. 1787 (1978); Synthesis, 852-854 (1986); Shin-Jikken-Kagaku-Koza, vol. 22, pp. 115 (1992)). The other reactive derivatives can also be prepared in accordance with known methods.

Among the objective compounds (I), those wherein the side chain A contains an unsaturated bond, especially a double bond, can also be prepared by reacting an aldehyde derivative of the general formula (III) below with an ylide compound corresponding to the rest of the side chain A-R under the conditions of the Wittig reaction:



(III) (I')

wherein A, B, R, X_1, X_2, X_3, Y and Z are as defined above.

The starting compound (III) can be prepared in accordance with a method described in, for example, Japanese Patent Publication (KOKAI) No. 256650/1990. Further, an ylide compound corresponding to the rest of the side chain A-R can be synthesized by reacting triphenylphosphine with a corresponding halogenated alkanoic acid, or an ester derivative, ether derivative or amide derivative thereof in the presence of a base according to a known method.

Among the objective compounds (I), those wherein R is COOH can be converted into a corresponding ester derivative, alcohol derivative, ether derivative, amide derivative, if desired. For example, ester derivatives can be prepared by esterifying a carboxylic acid in a conventional manner. An ester derivative, when reduced, gives an alcohol derivative, and amidated, gives an amide derivative. An ether derivative can be obtained by O-alkylating an alcohol derivative.

The compound (I) of the present invention shows antagonistic effect against PGD_2 in vitro through the binding to PGD_2 receptor, and is useful as a drug for treating diseases in which mast cell dysfunction due to excessive production of PGD_2 is involved. For example, the compound (I) is useful as a drug for treating diseases, such as systemic mastocytosis and disorder of systemic mast cell activation, and also tracheal contraction, asthma, allergic rhinitis, allergic conjunctivitis, urticaria, injury due to ischemic reperfusion, and inflammation. The compound (I) shows preventive effect on nasal occlusion in vivo, and therefore is especially useful as a drug for treating that.

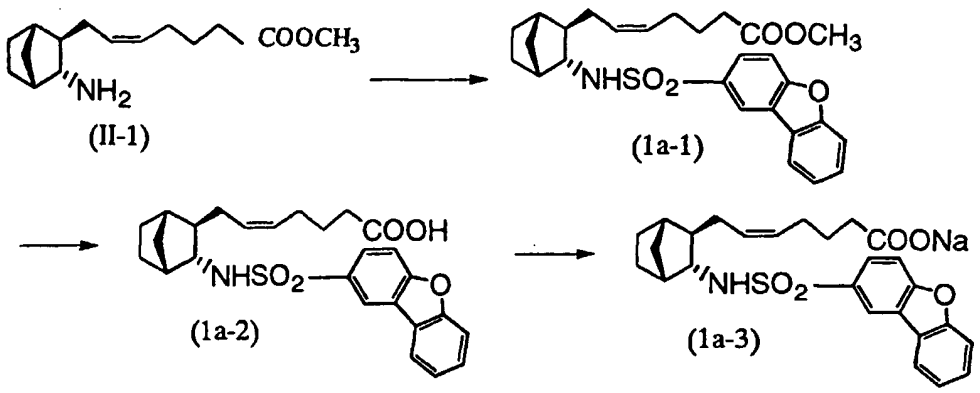
When using a compound (I) of the present invention in treatment, it can be formulated into ordinary formulations for oral and parenteral administration. A pharmaceutical composition containing a compound (I) of the present invention can be in the form for oral and parenteral administration. Specifically, it can be formulated into formulations for oral administration such as tablets, capsules, granules, powders, syrup, and the like; those for parenteral administration such as injectable solutions or suspensions for intravenous, intramuscular or subcutaneous injection, inhalant, eye drops, nasal drops, suppositories, or percutaneous formulations such as ointments.

In preparing the formulations, carriers, excipients, solvents, and bases known to one ordinary skilled in the art may be used. In case of tablets, they are prepared by compressing or formulating an active ingredient together with auxiliary components. Examples of usable auxiliary components include pharmaceutically acceptable excipients such as binders (e.g., cornstarch), fillers (e.g., lactose, microcrystalline cellulose), disintegrants (e.g., starch sodium glycolate) or lubricants (e.g., magnesium stearate). Tablets may be coated appropriately. In the case of liquid formulations such as syrups, solutions, or suspensions, they may contain suspending agents (e.g., methyl cellulose), emulsifiers (e.g., lecithin), preservatives, and the like. In the case of injectable formulations, it may be in the form of solution or suspension, or oily or aqueous emulsion, which may contain suspension-stabilizing agent or dispensing agent, and the like. In the case of an inhalant, it is formulated into a liquid formulation applicable to an inhaler. In the case of eye drops, it is formulated into a solution or a suspension. Especially, in the case of nasal drug for treating nasal occlusion, it can be used as a solution or suspension prepared by a conventional formulating method, or as a powder formulated using a powdering agent (e.g., hydroxypropyl cellulose, carbopole), which are administered into the nasal cavity. Alternatively, it can be used as an aerosol after filling into a special container together with a solvent of low boiling point.

Although an appropriate dosage of the compound (I) varies depending on the administration route, age, body weight, sex, or condition of the patient, and the kind of drug(s) used together, if any, and should be determined by the physician in the end, in the case of oral administration, the daily dosage can generally be between about 0.01 - 100 mg, preferably about 0.01 - 10 mg, more preferably about 0.1 - 10 mg, per kg body weight. In the case of parenteral administration, the daily dosage can generally be between about 0.001 - 100 mg, preferably about 0.001 - 1 mg, more preferably about 0.01 - 1 mg, per kg body weight. The daily dosage can be administered in 1 - 4 divisions.

The following Examples are provided to further illustrate the present invention and are not to be construed as limiting the scope thereof.

Example 1



Methyl (Z)-7-[(1S,2R,3R,4R)-3-aminobicyclo[2.2.1]hept-2-yl]-5-heptenoate (II-1) (251 mg, 1.00 mmol) was dissolved in methylene chloride (8 ml) and triethylamine (0.238 ml, 2.00 mmol) was added thereto under a nitrogen atmosphere. To the mixture was added 2-chlorosulfonyldibenzofuran (350 mg, 1.31 mmol) under ice-cooling, and the mixture was stirred for 30 min and allowed to warm up to room temperature. The reaction mixture was purified by column chromatography on silica gel (n-hexane/ethyl acetate (1:4)) and recrystallized from n-hexane (10 ml) to yield methyl (Z)-7-[(1S,2R,3R,4R)-3-(2-dibezofuryl)sulfonylaminobicyclo[2.2.1]hept-2-yl]-5-heptenoate (1a-1) (342 mg, 0.710 mmol). Yield 71 %, mp 115-116 °C.

Elemental analysis ($C_{27}H_{31}NO_5S$)				
Calcd. (%):	C, 67.34;	H, 6.49;	N, 2.91;	S, 6.66
Found (%):	C, 67.16;	H, 6.47 ;	N, 2.99;	S, 6.66

IR($CHCl_3$):3382,3024,2952,2874,1726,1583,1465,1442,1319,1245,1154 ,1121,1104,1071,1019,890,840,817 /cm.

^1H NMR($CDCl_3$)δ: 0.94-1.92(14H,m),2.15-2.24(3H,m),2.99-3.07(1H,m) 3.66(3H,s),4.98(1H,d,J=6.6Hz),5.10-5.22(2H,m),7.39-7.46(1H,m),7.51-7.70(3H,m),7.87-8.13(2H,m),8.53(1H,d,J=2.1Hz)

$[\alpha]_D$=0.6° ($CHCl_3$,c=1.01%,23°C).

($[\alpha]_{365}$=+37.0° ($CHCl_3$,c=1.01%,23°C).

Methyl (Z)-7-[(1S,2R,3R,4R)-3-(2-dibezofuryl)sulfonylaminobicyclo[2.2.1]hept-2-yl]-5-heptenoate (1a-1) (234 mg, 0.50 mmol) was dissolved in methanol (6 ml)/tetrahydrofuran (4 ml). To the solution was added 1 N potassium hydroxide (1.50 ml, 1.50 mmol) under ice-cooling. After the reaction mixture was warmed up to room temperature, it was allowed to react for 16 hr and concentrated to remove the solvent. To the residue were added ethyl acetate (50 ml) and water (10 ml), and then 1 N HCl (2.00 ml, 2.00 mmol), and the organic layer was separated. The organic layer was washed with saturated brine, dried over anhydrous sodium sulfate and concentrated. The residue was purified by column chromatography on silica gel (n-hexane/ethyl acetate (1:1) containing 0.2 % acetic acid) to yield (Z)-7-[(1S,2R,3R,4R)-3-(2-dibenzofuryl)sulfonylaminobicyclo[2.2.1]hept-2-yl]-5-heptenoic acid (1a-2) (203 mg, 0.434 mmol). Yield 87 %, oil.

IR ($CHCl_3$): 3266, 3026, 2952, 2874, 1708, 1465, 1443, 1423, 1319, 1267, 1245, 1153, 1121, 1104, 1072, 906 /cm.

^1H NMR($CDCl_3$)δ: 0.93-1.94(14H,m),2.12-2.19(1H,m), 2.26(2H,t, J=7.2Hz), 3.00-3.08(1H,m),5.12-5.25(2H,m), 5.26(1H,d,J=6.6Hz), 7.38-7.45(1H,m),7.51-7.70(3H,m),7.87-8.13(2H,m), 8.54(1H, d, J=2.1Hz).

$[\alpha]_D$=+6.8° ($CHCl_3$,c=1.08 %, 23 °C).

(Z)-7-[(1S,2R,3R,4R)-3-(2-Dibenzofuryl)sulfonylaminobicyclo[2.2.1]hept-2-yl]-5-heptenoic acid (1a-2) (453 mg, 0.97 mmol) was dissolved in methanol (5 ml). After addition of 1 N sodium methoxide/methanol (1.034 N, 0.937 ml, 0.97 mmol), the mixture was allowed to warm up to room temperature and to react for 1 hr. The solvent was removed by distillation to yield the sodium salt (1a-3) (457 mg, 0.933 mmol). Yield 96 %. Amorphous powder.

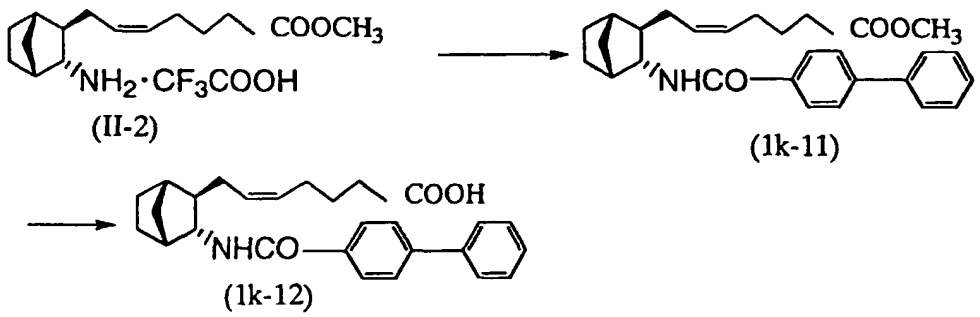
Elemental analysis ($C_{26}H_{28}NO_5SNa\ 0.6H_2O$)					
Calcd.(%) :	C,62.41;	H,5.88;	N,2.80;	S,6.41;	Na,4.59
Found (%) :	C,62.45;	H,5.92;	N,2.99;	S,6.49;	Na,4.46

IR (KBr) : 434, 3280, 3074, 3007, 2952, 2873, 1566, 1467, 1444, 1417, 1344, 1315, 1270, 1248, 1200, 1189, 1154, 1124, 1107, 1075, 1058, 895, 842, 818 /cm.

^{1}H NMR(CD_3OD)δ: 1.02-2.05(16H, m), 2.16-2.23(1H, m), 2.94-3.00(1H, m), 4.98-5.05(2H, m), 7.41-7.48(1H, m), 7.53-7.62(1H, m), 7.66(1H, d, J=8.4Hz), 7.77(1H, d, J=8.4Hz), 8.57(1H, d, J=2.1Hz).

$[\alpha]_D$=-15.2° (CH_3OH, c=1.07%, 22°C).

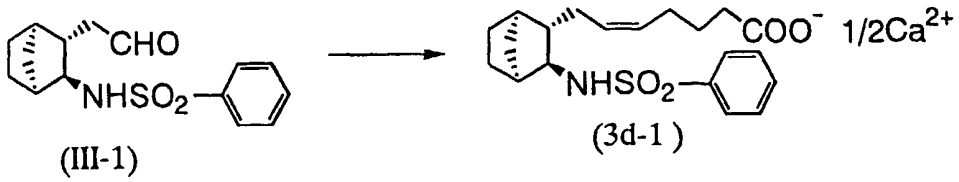
Example 2



Methyl (Z)-7-[(1S,2R,3R,4R)-3-aminobicyclo[2.2.1]hept-2-yl]-5-heptenoate trifrluroroacetate (II-2) (232 mg, 0.636 mmol), which was prepared by the method described in Reference Example 4 of the Japanese Patent Publication (KOKOKU) No. 79060/1993, was dissolved in methylene chloride (5 ml). To the solution were added triethylamine (0.279 ml, 2.00 mmol) and 4-biphenylcarbonyl chloride under ice-cooling and stirred for 7 hr at the same temperature. The reaction mixture was purified by column chromatography on silica gel (ethyl acetate/n-hexane (1:4)) to yield methyl (Z)-7-[(1S,2R,3R,4R)-3-(4-biphenyl)carbonylaminobicyclo[2.2.1]hept-2-yl]-5-heptenoate (1k-11) (221 mg, 0.512 mmol). The compound (1k-11) (190 mg, 0.440 mmol) was dissolved in methanol (6 ml). To the solution was added 1 N KOH (1.10 ml, 1.10 mmol) under ice-cooling and stirred for 15 hr at room temperature. The reaction mixture was concentrated in vacuo. The residue, after the addition of water (20 ml) and 1 N HCl (2 ml), was extracted with ethyl acetate. The organic layer was washed with saturated brine, dried over anhydrous sodium sulfate and concentrated. The residue was purified by column chromatography on silica gel (ethyl acetate/hexane (1:1) containing 0.3 % acetic acid) to yield (Z)-7-[(1S,2R,3R,4R)-3-(4-biphenyl)carbonylaminobicyclo[2.2.1]hept-2-yl]-5-heptenoic acid (1k-12) (172 mg, 0.412 mmol). Yield 94 %.

The following compounds can also be prepared in the following manner.

Example 3



(III-1) (3d-1)

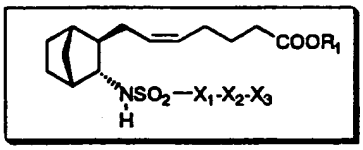
To a suspension of 4-carboxybutyltriphenylphosphonium bromide (14.8 g, 33.3 mmol) and tetrahydrofuran (80 ml) was added potassium t-butyrate (7.55 g, 67.3 mmol) at room temperature under a nitrogen atmosphere. After stirring for 1 hr at room temperature, the mixture was cooled to -20°C and a solution of N-[(1S,2S,3S,4R)-3-formylmethylbicyclo[2.2.1]hept-2-yl]benzenesulfonamide (III-1) (Japanese Patent Publication (KOKAI) No. 256650/1990, Reference Example 2) (3.25 g, 11.1 mmol) in tetrahydrofuran (20 ml) was added slowly. After stirring for about 1 hr at -20 °C, the ice bath was removed and the mixture was further stirred for 1 hr. To the reaction solution was added 2 N HCl and the mixture was extracted with ethyl acetate, washed with water and brine, and concentrated. After the addition of toluene and 1 N sodium hydroxide to the resultant crude product, aqueous layer was separated. The organic layer was washed with water again and the washing was combined with the previously obtained aqueous layer. After the addition of 2 N HCl, the aqueous solution was extracted with ethyl acetate. The extract was washed with water and brine, dried over sodium sulfate, and concentrated. The residue was purified by column chromatography on silica gel to obtain calcium (Z)-7-[(1R,2S,3S,4S)-3-phenylsulfonylaminobicyclo[2.2.1]hept-2-yl]-5-heptenoate (1d-1) (3.29 g, yield 79 %, mp 62°C).

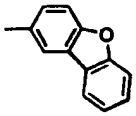
Elemental analysis ($C_{20}H_{27}NO_4S$)				
Calcd.(%) :	C, 63.63;	H, 7.21;	N, 3.71;	S, 8.49
Found (%) :	C, 63.56;	H, 7.21;	N, 3.83;	S, 8.43

$[\alpha]_D$=+ 5.3 ± 0.5° ($CHCl_3$, c=1.003 %, 22°C)
$[\alpha]_D$=+27.1 ± 0.7° (MeOH, c=1.015 % 24 °C)
IR(Nujol) 3282, 3260, 3300, 2400, 1708, 1268, 1248, 1202, 1162, 1153, 1095, 1076/cm.
^{1}H NMR δ 0.88-2.10(m,14H), 2.14(br S, 1H), 2.34(t, J=7.2Hz, 2H), 2.95-3.07(m, 1H), 5.13-5.35(m, 3H), 7.45-7.64(m, 3H), 7.85-7.94(m , 2H), 9.52(brS, 1H).

Compounds prepared in accordance with a method described in Examples above are shown in Tables below.

Table 1a



No.	R_1	X_1-X_2-X_3
1a-1	CH_3	
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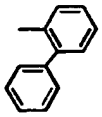
1a-3	Na	
1a-4	CH_3	
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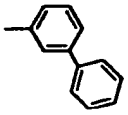
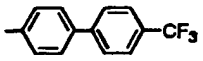
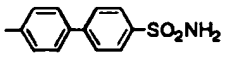
1a-6	CH_3	
1a-7	H	
1a-8	CH_3	
1a-9	H	
1a-10	CH_3	
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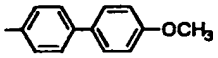
1a-12	CH_3	
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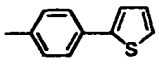
1a-14	CH_3	
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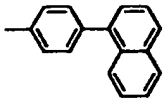
1a-16	CH_3	
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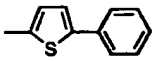
1a-18	CH_3	
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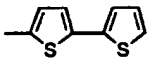
1a-20	CH_3	
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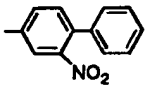
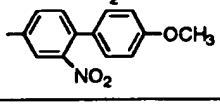
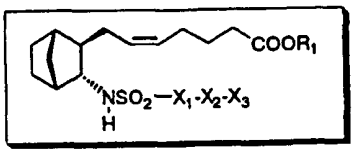
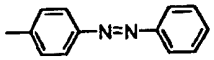
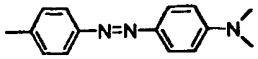
1a-22	H	
1a-23	H	



No.	R_1	X_1--X_2-X_3
1a-24	CH_3	
1a-25	H	
1a-26	Na	
1a-27	CH_3	
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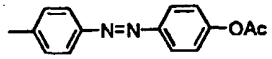
1a-29	Na	
1a-30	CH_3	
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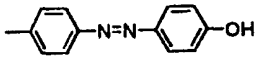
1a-32	CH_3	
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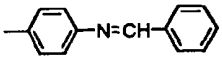
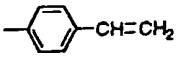
1a-34	CH_3	
1a-35	CH_3	
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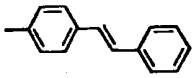
1a-37	CH_3	
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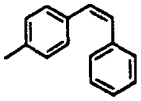
1a-39	CH_3	
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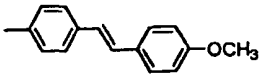
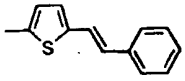
1a-41	H	
1a-42	CH_3	
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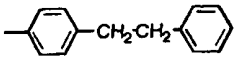
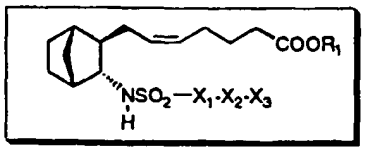
1a-44	CH_3	
1a-45	H	



No.	R_1	X_1-X_2-X_3
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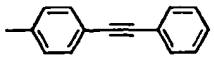
1a-47	H	
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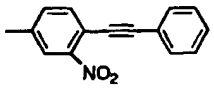
1a-49	CH_3	
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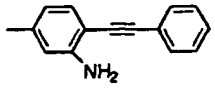
1a-51	CH_3	
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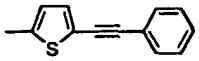
1a-53	CH_3	
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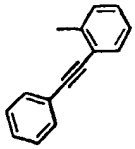
1a-55	CH_3	
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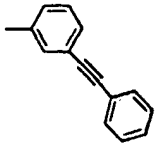
1a-57	CH_3	
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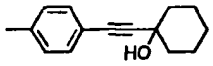
1a-59	CH_3	
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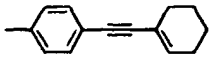
1a-61	CH_3	
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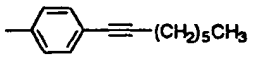
1a-63	CH_3	
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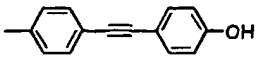
1a-65	CH_3	
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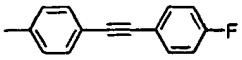
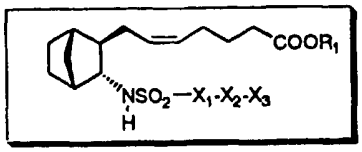
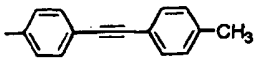
1a-67	CH_3	
1a-68	H	



No.	R_1	X_1-X_2-X_3
1a-69	CH_3	
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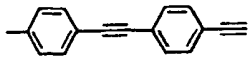
1a-71	CH_3	
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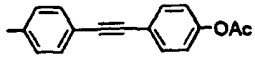
1a-73	CH_3	
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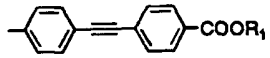
1a-75	CH_3	
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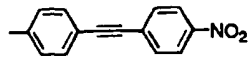
1a-77	CH_3	
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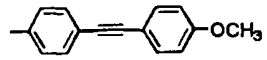
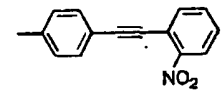
1a-79	H	
1a-80	CH_3	
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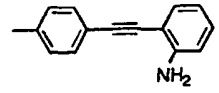
1a-82	CH_3	
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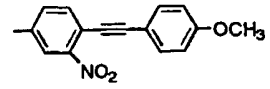
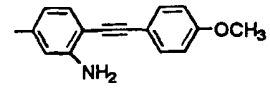
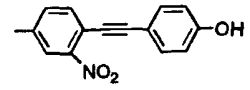
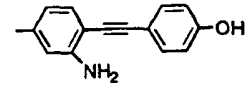
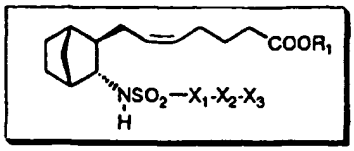
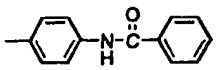
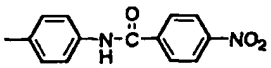
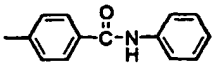
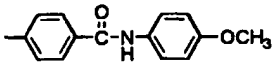
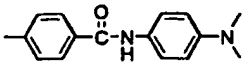
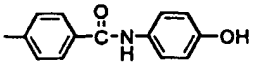
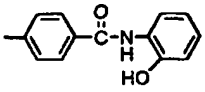
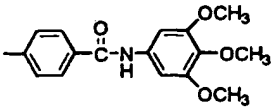
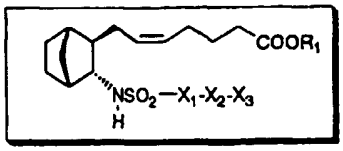
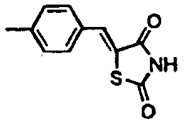
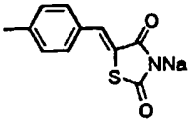
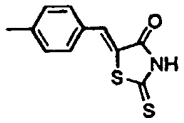
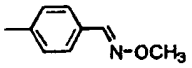
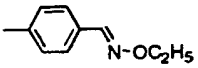
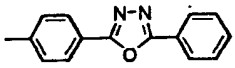
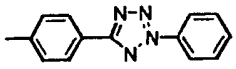
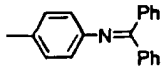
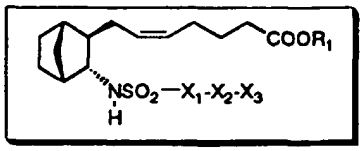
1a-84	H	
1a-85	H	
1a-86	H	
1a-87	H	

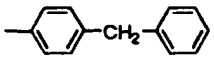
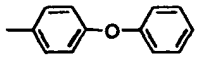
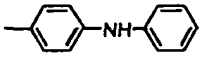
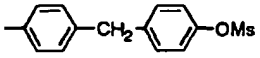
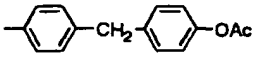
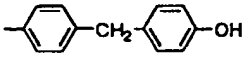
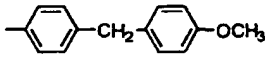
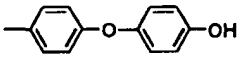
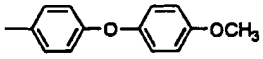
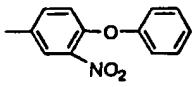
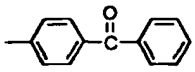
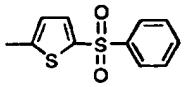
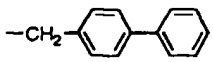


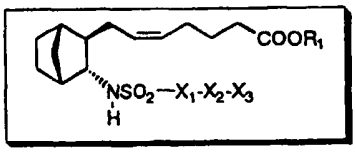
No.	R_1	X_1-X_2-X_3
1a-88	CH_3	
1a-89	H	
1a-90	CH_3	
1a-91	H	
1a-92	CH_3	
1a-93	H	
1a-94	H	
1a-95	H	
1a-96	H	
1a-97	H	
1a-98	H	
1a-99	Na	

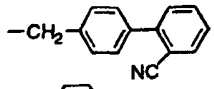
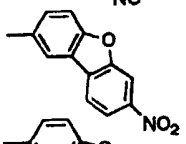
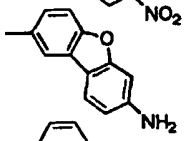
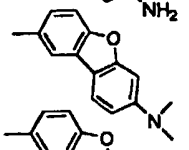
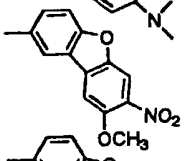
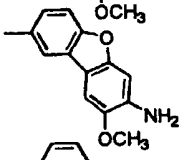
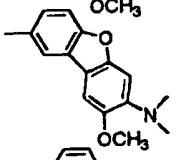
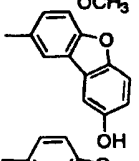
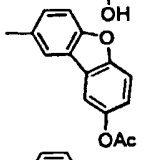
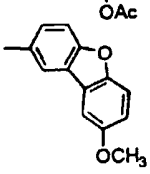


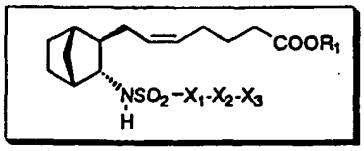
No.	R_1	X_1-X_2-X_3
1a-100	CH_3	
1a-101	H	
1a-102	CH_3	
1a-103	CH_3	
1a-104	H	
1a-105	CH_3	
1a-106	H	
1a-107	CH_3	
1a-108	H	
1a-109	CH_3	
1a-110	H	
1a-111	CH_3	
1a-112	H	
1a-113	CH_3	
1a-114	H	

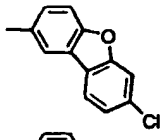
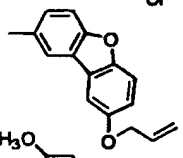
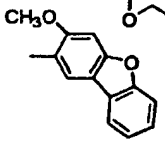
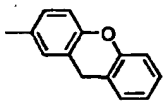
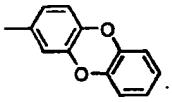
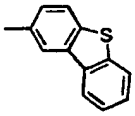
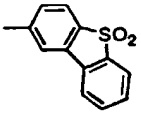
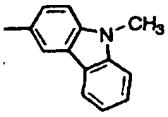
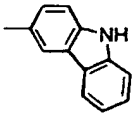


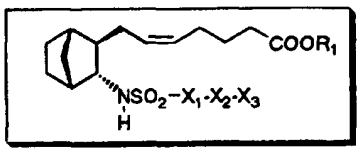
No.	R_1	X_1-X_2-X_3
1a-115	CH_3	
1a-116	H	
1a-117	Na	
1a-118	*i*-Pr	
1a-119	CH_3	
1a-120	Na	
1a-121	H	
1a-122	CH_3	
1a-123	H	
1a-124	CH_3	
1a-125	CH_3	
1a-126	H	
1a-127	CH_3	
1a-128	H	
1a-129	CH_3	
1a-130	CH_3	
1a-131	H	
1a-132	CH_3	
1a-133	H	
1a-134	H	
1a-135	CH_3	
1a-136	H	
1a-137	CH_3	
1a-138	H	
1a-139	CH_3	
1a-140	H	

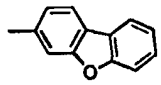
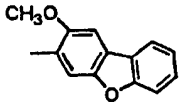
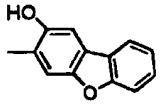
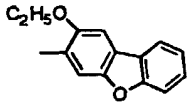
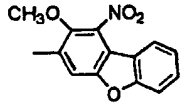
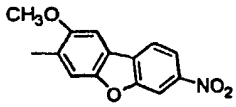
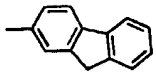
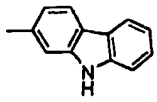
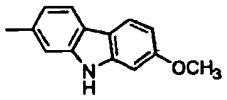
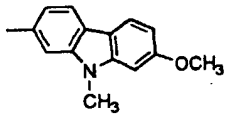
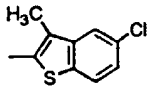


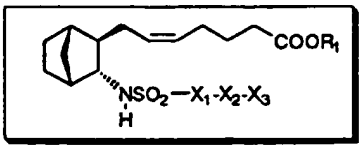
No.	R_1	X_1-X_2-X_3
1a-141	CH_3	
1a-142	H	
1a-143	H	
1a-144	H	
1a-145	H	
1a-146	H	
1a-147	H	
1a-148	H	
1a-149	H	
1a-150	H	
1a-151	H	

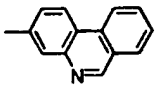
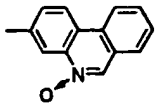
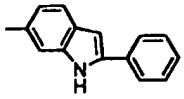
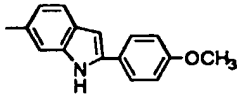
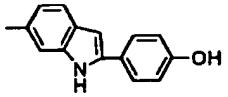
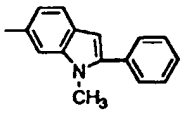
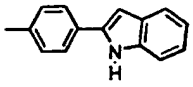


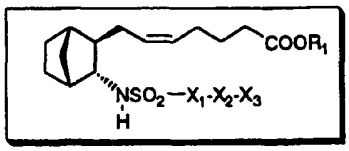
No.	R_1	X_1-X_2-X_3
1a-152	H	
1a-153	H	
1a-154	H	
1a-155	H	
1a-156	H	
1a-157	H	
1a-158	H	
1a-159	H	
1a-160	H	

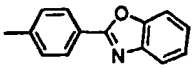
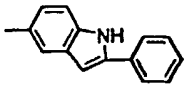
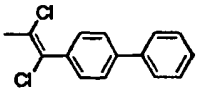
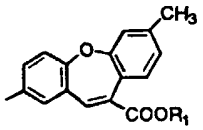
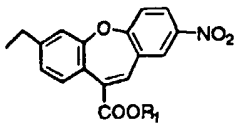
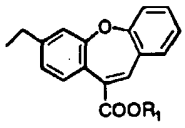


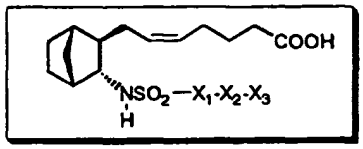
No.	R_1	X_1-X_2-X_3
1a-161	H	
1a-162	H	
1a-163	H	
1a-164	H	
1a-165	H	
1a-166	H	
1a-167	H	
1a-168	H	
1a-169	H	
1a-170	H	
1a-171	CH_3	
1a-172	H	

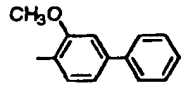
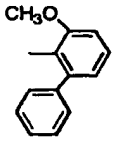
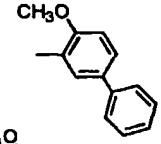
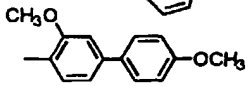
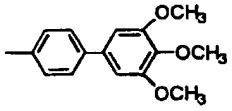
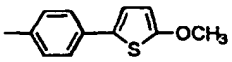
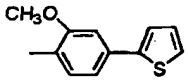
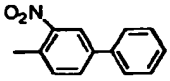
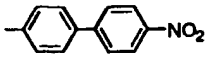
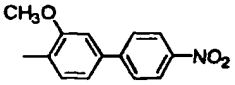


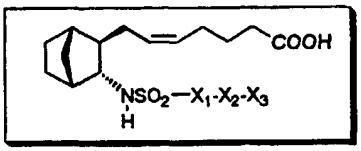
No.	R_1	X_1-X_2-X_3
1a-173	H	
1a-174	H	
1a-175	CH_3	
1a-176	H	
1a-177	CH_3	
1a-178	H	
1a-179	CH_3	
1a-180	H	
1a-181	H	
1a-182	CH_3	
1a-183	H	

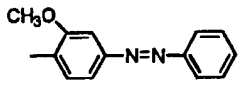
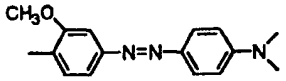
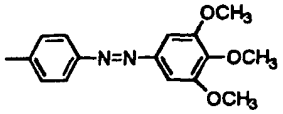
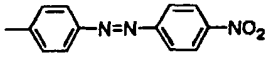
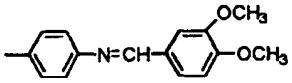
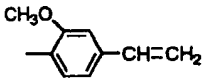
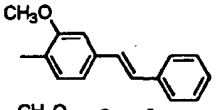
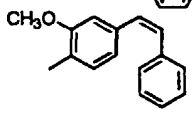
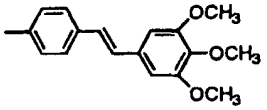
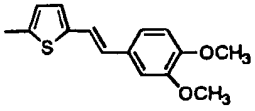


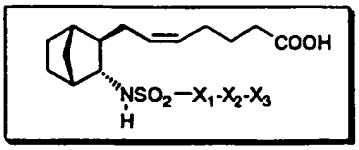
No.	R_1	X_1-X_2-X_3
1a-184	H	
1a-185	H	
1a-186	CH_3	
1a-187	H	
1a-188	CH_3	
1a-189	H	
1a-190	CH_3	
1a-191	H	
1a-192	CH_3	
1a-193	H	

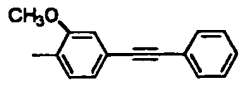
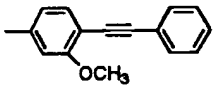
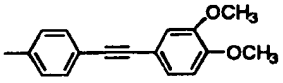
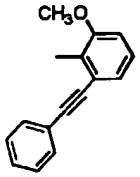
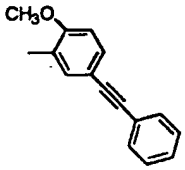
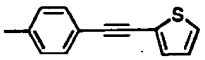
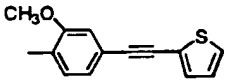
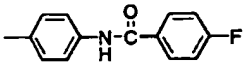
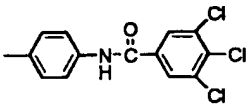
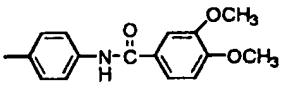


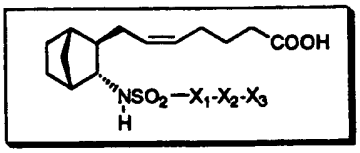
No.	X_1-X_2-X_3
1a-194	
1a-195	
1a-196	
1a-197	
1a-198	
1a-199	
1a-200	
1a-0201	
1a-202	
1a-203	

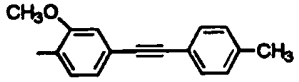
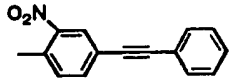
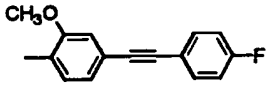
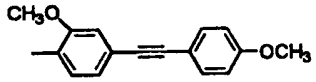
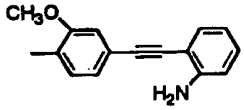
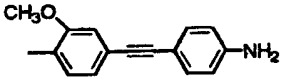
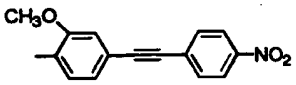
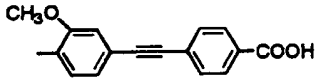
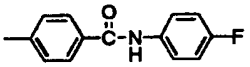
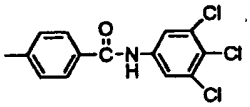
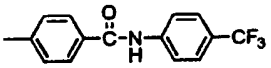
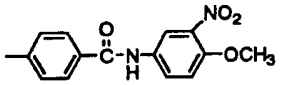


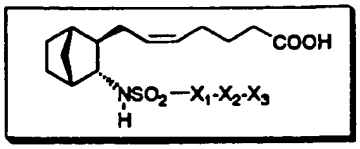
No.	X_1-X_2-X_3
1a-204	
1a-205	
1a-206	
1a-207	
1a-208	
1a-209	
1a-210	
1a-211	
1a-212	
1a-213	

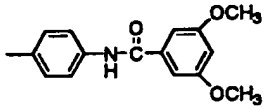
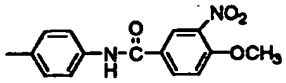
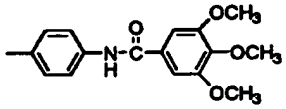
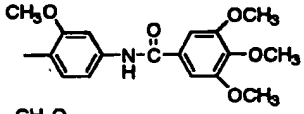
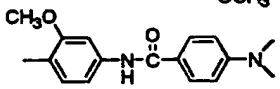
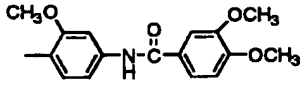
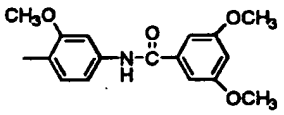
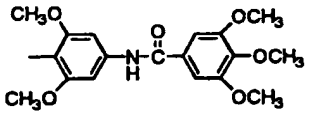
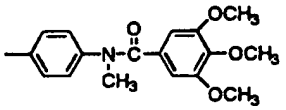
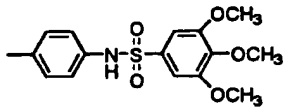
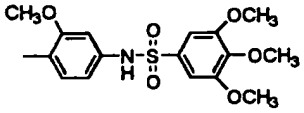


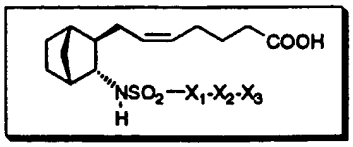
No.	X_1-X_2-X_3
1a-214	
1a-215	
1a-216	
1a-217	
1a-218	
1a-219	
1a-220	
1a-221	
1a-222	
1a-223	

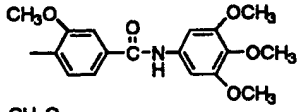
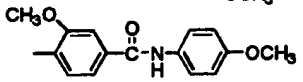
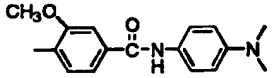
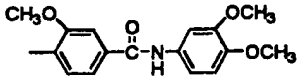
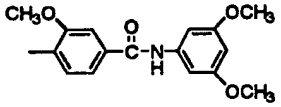
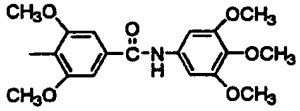
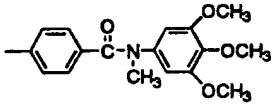
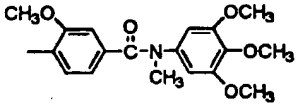
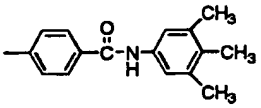
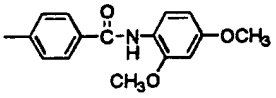
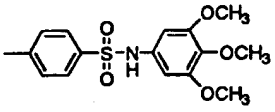


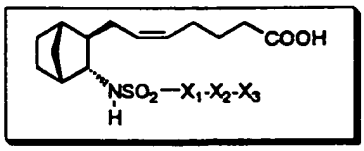
No.	X_1-X_2-X_3
1a-224	
1a-225	
1a-226	
1a-227	
1a-228	
1a-229	
1a-230	
1a-231	
1a-232	
1a-233	
1a-234	
1a-235	

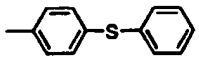
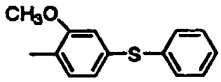
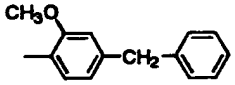
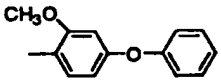
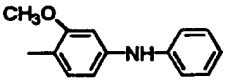
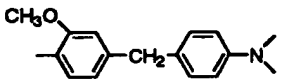
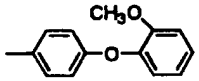
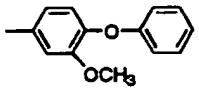
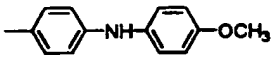
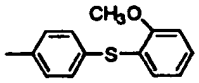
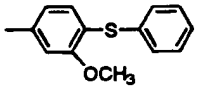
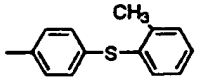
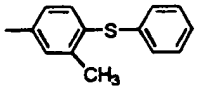
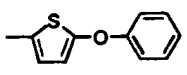


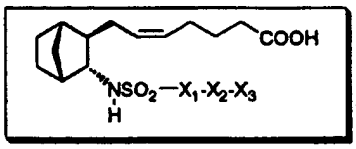
No.	X_1-X_2-X_3
1a-236	
1a-237	
1a-238	
1a-239	
1a-240	
1a-241	
1a-242	
1a-243	
1a-244	
1a-245	
1a-246	

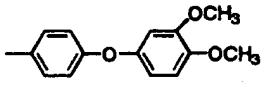
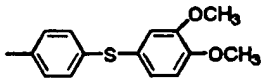
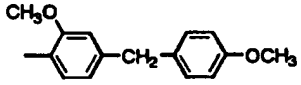
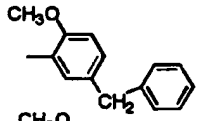
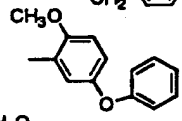
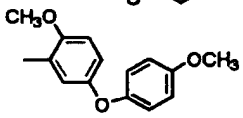
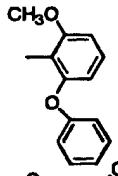
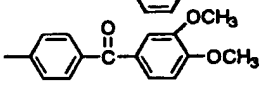
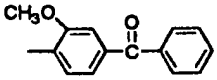
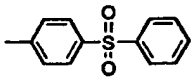
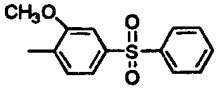
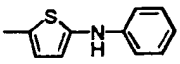


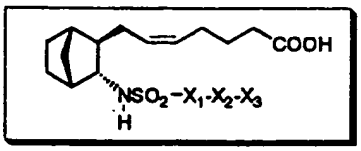
No.	X_1-X_2-X_3
1a-247	
1a-248	
1a-249	
1a-250	
1a-251	
1a-252	
1a-253	
1a-254	
1a-255	
1a-256	
1a-257	



No.	X_1-X_2-X_3
1a-258	
1a-259	
1a-260	
1a-261	
1a-262	
1a-263	
1a-264	
1a-265	
1a-266	
1a-267	
1a-268	
1a-269	
1a-270	
1a-271	



No.	X_1-X_2-X_3
1a-272	
1a-273	
1a-274	
1a-275	
1a-276	
1a-277	
1a-278	
1a-279	
1a-280	
1a-281	
1a-282	
1a-283	



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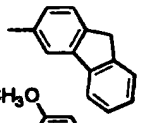
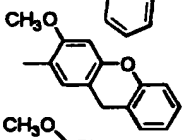
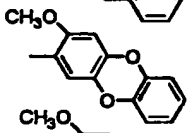
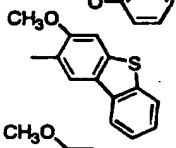
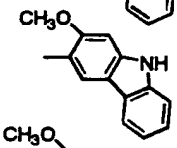
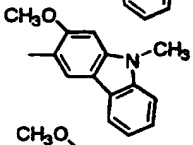
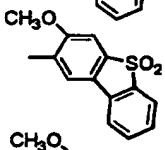
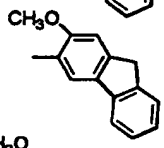
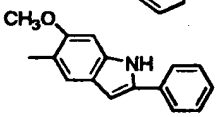
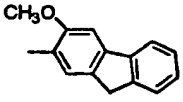
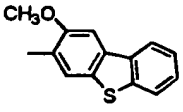
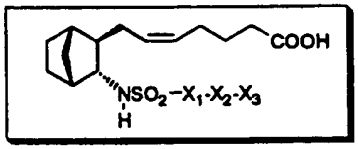
1a-284	
1a-285	
1a-286	
1a-287	
1a-288	
1a-289	
1a-290	
1a-291	
1a-292	
1a-293	
1a-294	



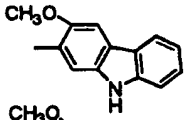
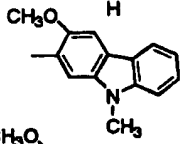
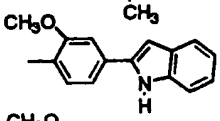
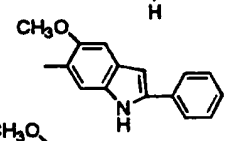
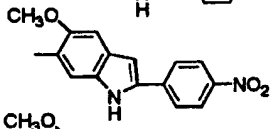
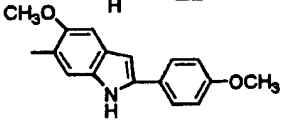
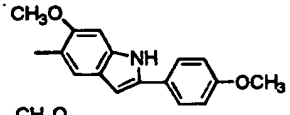
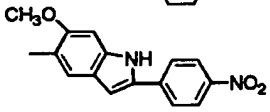
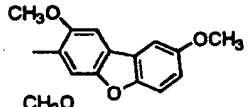
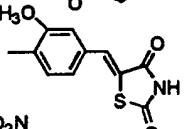
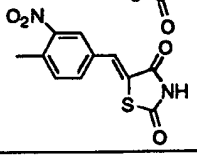
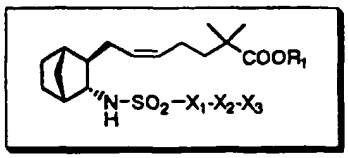
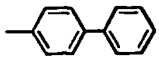
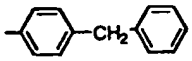
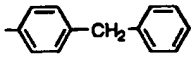
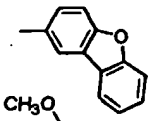
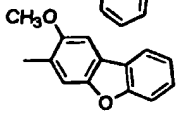
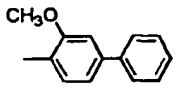
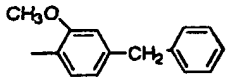
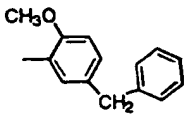
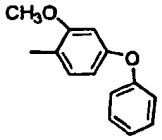
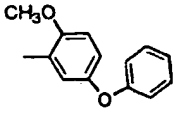
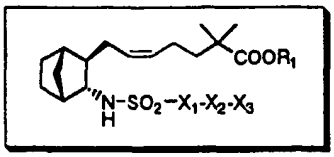
No.	X_1-X_2-X_3
1a-295	
1a-296	
1a-297	
1a-298	
1a-299	
1a-300	
1a-301	
1a-302	
1a-303	
1a-304	
1a-305	

Table 1b



No.	R_1	X_1-X_2-X_3
1b-1	CH_3	
1b-2	CH_3	
1b-3	H	
1b-4	H	
1b-5	H	
1b-6	H	
1b-7	H	
1b-8	H	
1b-9	H	
1b-10	H	



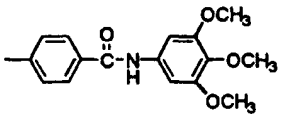
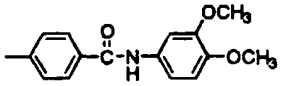
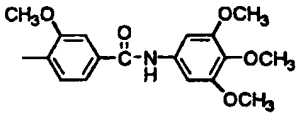
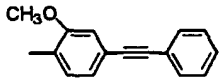
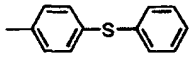
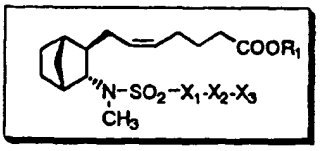
No.	R_1	X_1-X_2-X_3
1b-11	H	
1b-12	H	
1b-13	H	
1b-14	H	
1b-15	H	

Table 1c



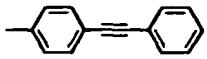
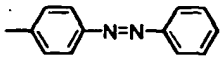
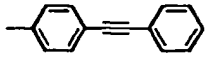
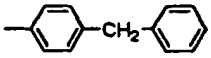
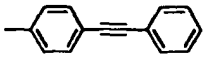
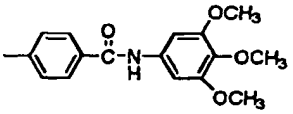
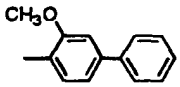
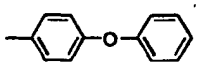
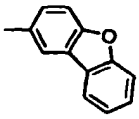
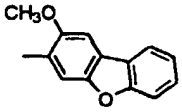
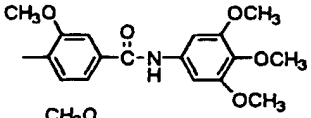
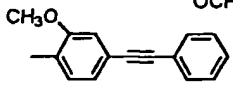
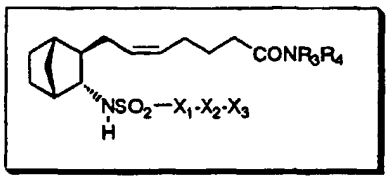
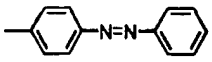
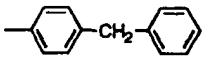
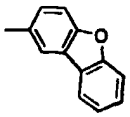
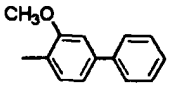
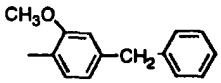
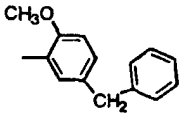
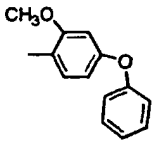
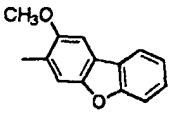
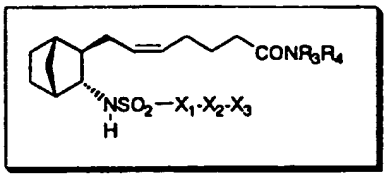
No.	R_1	X_1-X_2-X_3
1c-1	CH_3	
1c-2	CH_3	
1c-3	K	
1c-4	H	
1c-5	H	
1c-6	H	
1c-7	H	
1c-8	H	
1c-9	H	
1c-10	H	
1c-11	H	
1c-12	H	

Table 1d



No.	R_3	R_4	X_1-X_2-X_3
1d-1	H	SO_2CH_3	
1d-2	H	H	
1d-3	H	OH	
1d-4	H	SO_2CH_3	
1d-5	H	SO_2CH_3	
1d-6	H	SO_2CH_3	
1d-7	H	SO_2CH_3	
1d-8	H	SO_2CH_3	
1d-9	H	SO_2CH_3	
1d-10	H	SO_2CH_3	



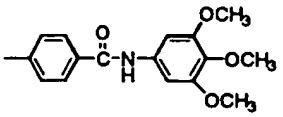
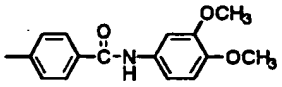
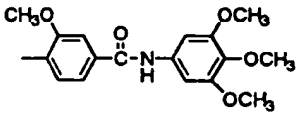
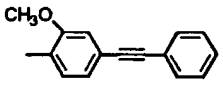
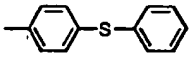
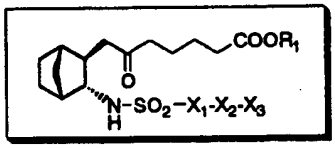
No.	R_3	R_4	X_1-X_2-X_3
1d-11	H	SO_2CH_3	
1d-12	H	SO_2CH_3	
1d-13	H	SO_2CH_3	
1d-14	H	SO_2CH_3	
1d-15	H	SO_2CH_3	

Table 1e



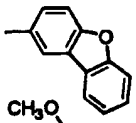
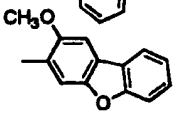
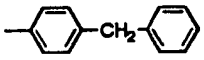
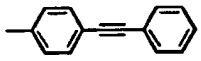
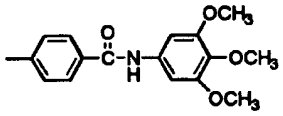
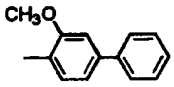
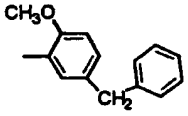
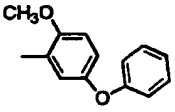
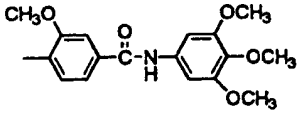
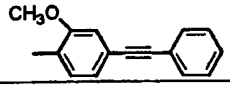
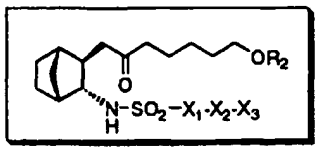
No.	R_1	X_1-X_2-X_3
1e-1	H	
1e-2	H	
1e-3	H	
1e-4	H	
1e-5	H	
1e-6	H	
1e-7	H	
1e-8	H	
1e-9	H	
1e-10	H	

Table 1f



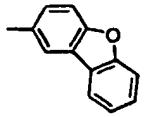
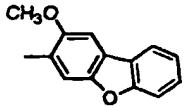
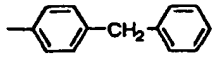
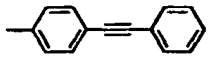
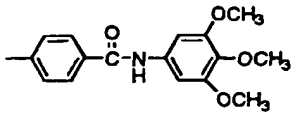
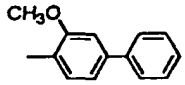
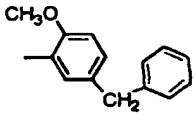
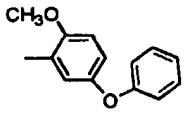
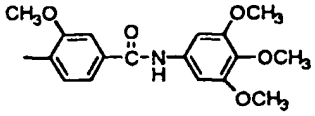
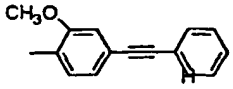
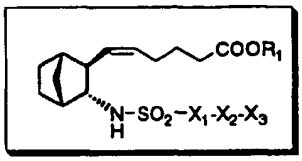
No.	R_2	X_1-X_2-X_3
1f-1	H	
1f-2	H	
1f-3	H	
1f-4	H	
1f-5	H	
1f-6	H	
1f-7	H	
1f-8	H	
1f-9	H	
1f-10	H	

Table 1g



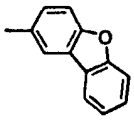
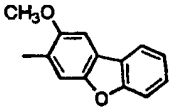
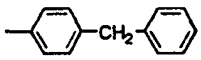
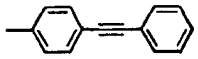
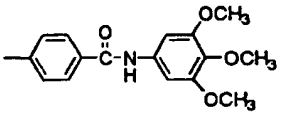
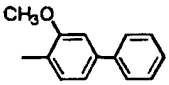
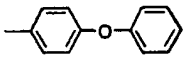
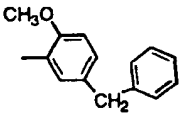
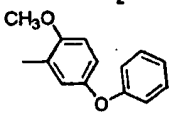
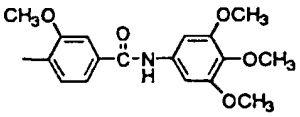
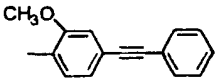
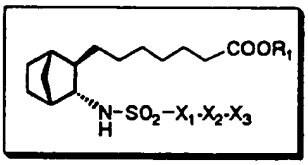
No.	R_1	X_1-X_2-X_3
1g-1	H	
1g-2	H	
1g-3	H	
1g-4	H	
1g-5	H	
1g-6	H	
1g-7	H	
1g-8	H	
1g-9	H	
1g-10	H	
1g-11	H	

Table 1h



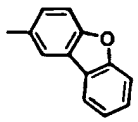
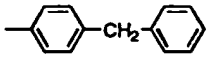
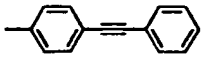
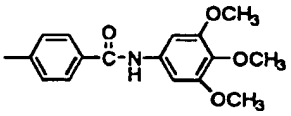
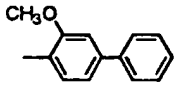
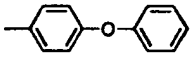
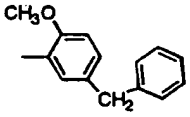
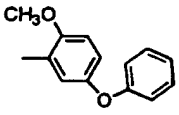
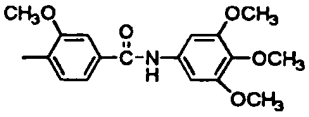
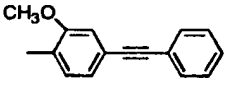
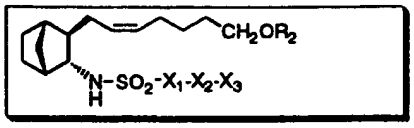
No.	R_1	X_1-X_2-X_3
1h-1	H	
1h-2	H	
1h-3	H	
1h-4	H	
1h-5	H	
1h-6	H	
1h-7	H	
1h-8	H	
1h-9	H	
1h-10	H	

Table 1i



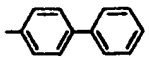
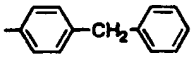
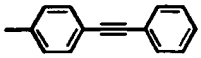
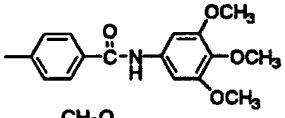
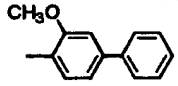
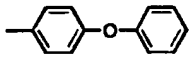
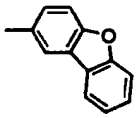
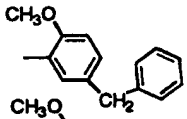
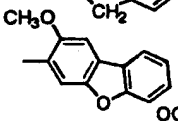
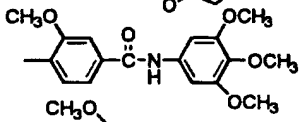
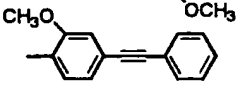
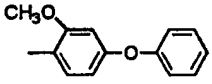
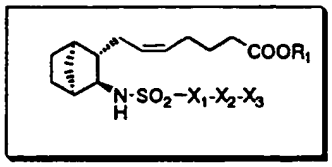
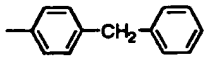
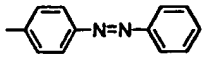
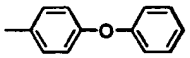
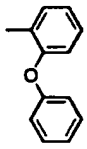
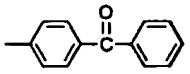
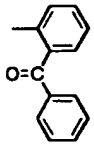
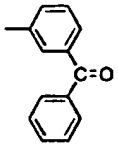
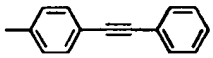
No.	R_2	X_1-X_2-X_3
1i-1	H	
1i-2	H	
1i-3	H	
1i-4	H	
1i-5	H	
1i-6	H	
1i-7	H	
1i-8	H	
1i-9	H	
1i-10	H	
1i-11	H	
1i-12	H	

Table 1j



No.	R_1	X_1-X_2-X_3
1j-1	CH_3	
1j-2	H	
1j-3	Na	
1j-4	H	
1j-5	CH_3	
1j-6	CH_3	
1l-7	H	
1j-8	CH_3	
1j-9	CH_3	
1j-10	H	
1j-11	CH_3	
1j-12	H	
1j-13	CH_3	
1j-14	H	
1j-15	CH_3	
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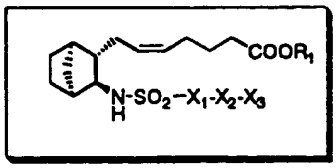
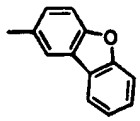
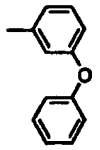
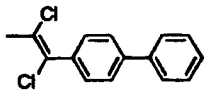
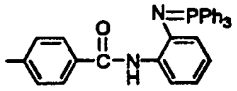
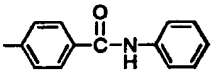
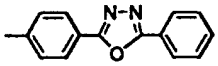
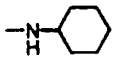
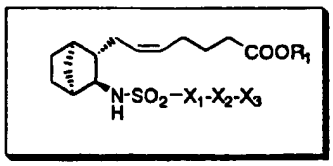


No.	R_1	X_1-X_2-X_3
1j-17	H	
1j-18	CH_3	
1j-19	H	
1j-20	CH_3	
1j-21	H	
1j-22	H	
1j-23	CH_3	
1j-24	H	
1j-25	CH_3	
1j-26	H	
1j-27	H	
1j-28	CH_3	
1j-29	H	



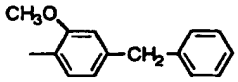
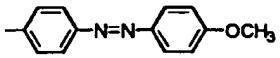
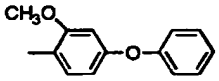
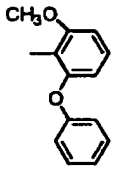
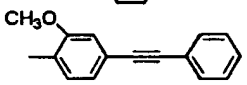
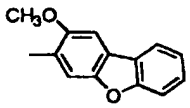
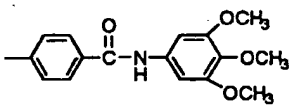
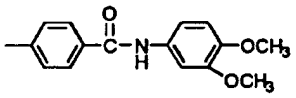
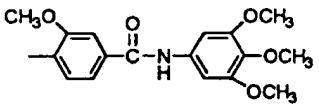
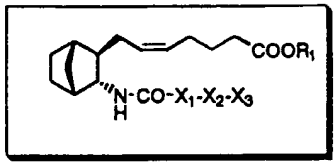
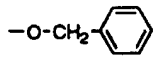
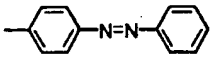
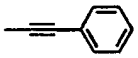
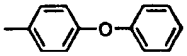
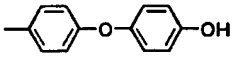
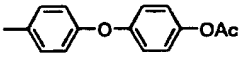
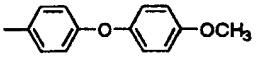
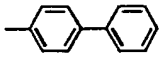
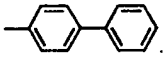
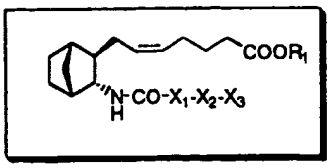
No.	R_1	X_1-X_2-X_3
1j-30	H	
1j-31	H	
1j-32	H	
1j-33	H	
1j-34	H	
1j-35	H	
1j-36	H	
1j-37	H	
1j-38	H	

Table 1k



No.	R_1	X_1-X_2-X_3
1k-1	H	
1k-2	CH_3	
1k-3	H	
1k-4	H	
1k-5	H	
1k-6	H	
1k-7	H	
1k-8	H	
1k-9	H	
1k-10	H	
1k-11	CH_3	
1k-12	H	



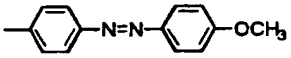
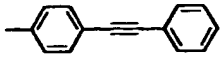
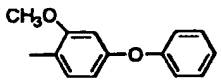
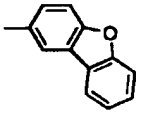
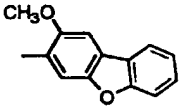
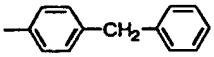
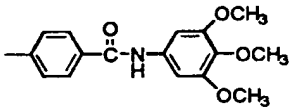
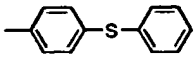
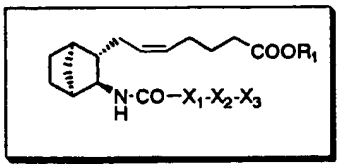
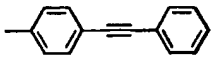
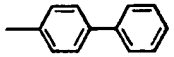
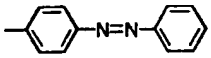
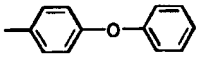
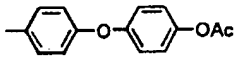
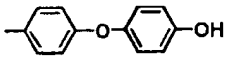
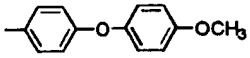
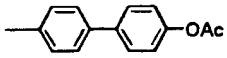
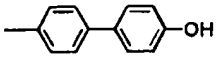
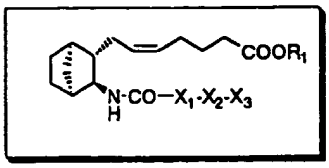
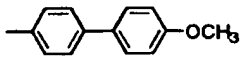
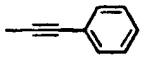
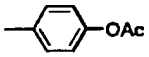
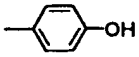
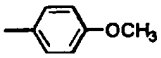
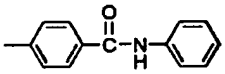
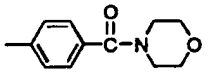
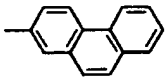
No.	R_1	X_1-X_2-X_3
1k-13	H	
1k-14	H	
1k-15	H	
1k-16	H	
1k-17	H	
1k-18	H	
1k-19	H	
1k-20	H	

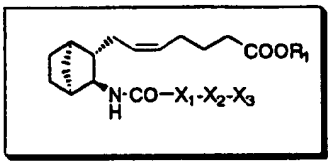
Table 1m



No.	R_1	X_1-X_2-X_3
1m-1	CH_3	
1m-2	H	
1m-3	CH_3	
1m-4	H	
1m-5	CH_3	
1m-6	H	
1m-7	CH_3	
1m-8	H	
1m-9	CH_3	
1m-10	H	
1m-11	CH_3	
1m-12	H	
1m-13	CH_3	
1m-14	H	
1m-15	CH_3	
1m-16	H	
1m-17	CH_3	
1m-18	H	



No.	R_1	X_1-X_2-X_3
1m-19	CH_3	
1m-20	H	
1m-21	H	
1m-22	H	
1m-23	CH_3	
1m-24	H	
1m-25	CH_3	
1m-26	H	
1m-27	CH_3	
1m-28	H	
1m-29	CH_3	
1m-30	H	
1m-31	H	
1m-32	H	
1m-33	H	



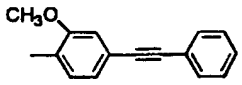
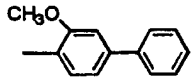
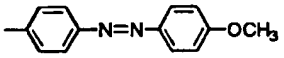
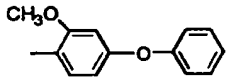
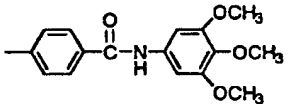
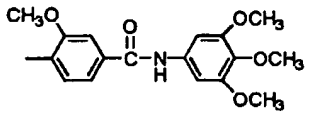
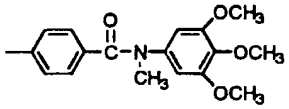
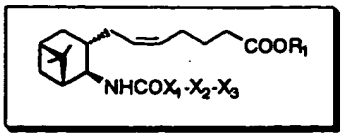
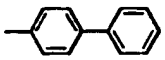
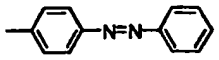
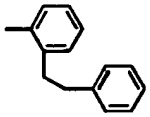
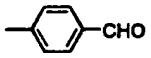
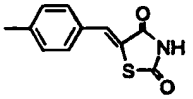
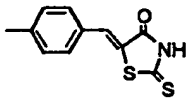
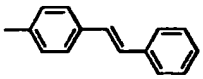
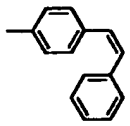
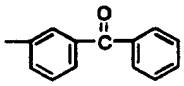
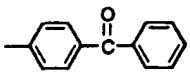
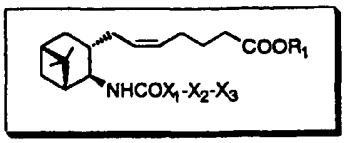
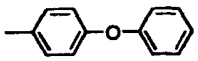
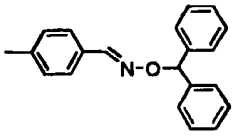
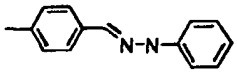
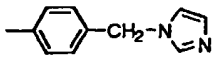
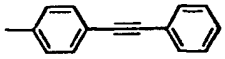
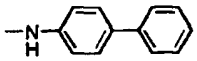
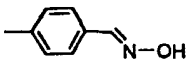
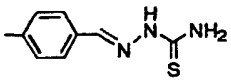
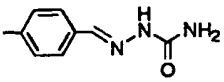
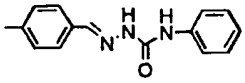
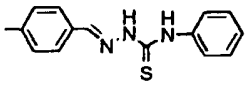
No.	R_1	X_1-X_2-X_3
1m-34	H	
1m-35	H	
1m-36	H	
1m-37	H	
1m-38	H	
1m-39	H	
1m-40	H	

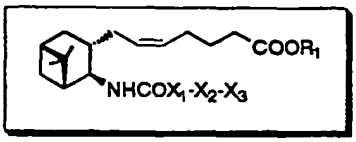
Table 2a

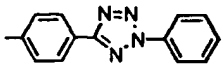
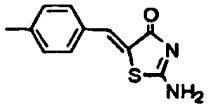
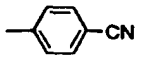
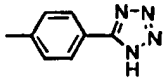
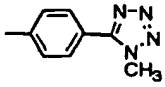
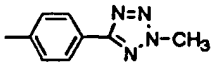
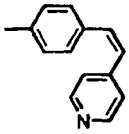
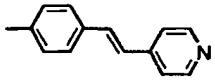
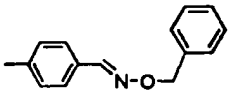
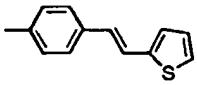


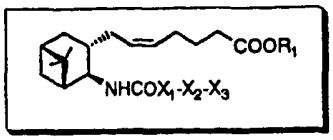
No.	R_1	X_1-X_2-X_3
2a-1	CH_3	
2a-2	H	
2a-3	CH_3	
2a-4	H	
2a-5	Na	
2a-6	CH_3	
2a-7	H	
2a-8	CH_3	
2a-9	H	
2a-10	CH_3	
2a-11	H	
2a-12	CH_3	
2a-13	H	
2a-14	CH_3	
2a-15	H	
2a-16	CH_3	
2a-17	H	
2a-18	CH_3	
2a-19	H	
2a-20	CH_3	
2a-21	H	
2a-22	Na	
2a-23	CH_3	
2a-24	H	

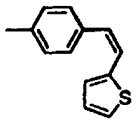
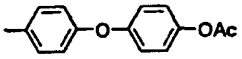
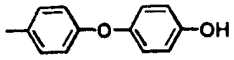
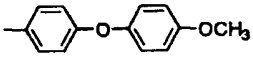
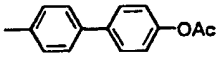
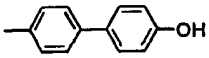
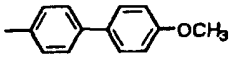
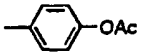
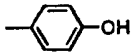
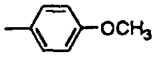


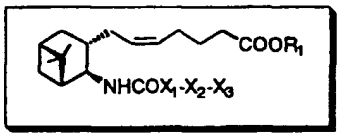
No.	R_1	X_1-X_2-X_3
2a-25	CH_3	
2a-26	H	
2a-27	CH_3	
2a-28	H	
2a-29	CH_3	
2a-30	H	
2a-31	CH_3	
2a-32	CH_3	
2a-33	H	
2a-34	CH_3	
2a-35	H	
2a-36	CH_3	
2a-37	H	
2a-38	CH_3	
2a-39	H	
2a-40	CH_3	
2a-41	H	
2a-42	CH_3	
2a-43	H	
2a-44	CH_3	
2a-45	H	
2a-46	CH_3	
2a-47	H	

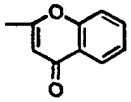
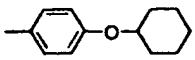
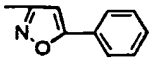
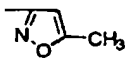
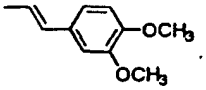
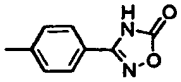
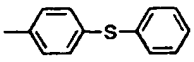
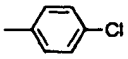


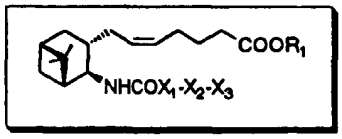
No.	R_1	X_1-X_2-X_3
2a-48	CH_3	
2a-49	H	
2a-50	CH_3	
2a-51	H	
2a-52	CH_3	
2a-53	H	
2a-54	CH_3	
2a-55	H	
2a-56	CH_3	
2a-57	H	
2a-58	CH_3	
2a-59	H	
2a-60	CH_3	
2a-61	H	
2a-62	CH_3	
2a-63	H	
2a-64	CH_3	
2a-65	H	
2a-66	CH_3	
2a-67	H	

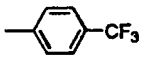
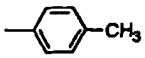
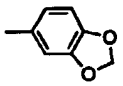
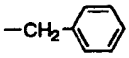
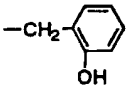
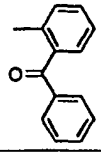


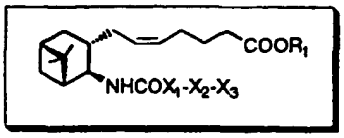
No.	R_1	X_1-X_2-X_3
2a-68	CH_3	
2a-69	H	
2a-70	CH_3	
2a-71	H	
2a-72	CH_3	
2a-73	H	
2a-74	CH_3	
2a-75	H	
2a-76	CH_3	
2a-77	H	
2a-78	CH_3	
2a-79	H	
2a-80	CH_3	
2a-81	H	
2a-82	CH_3	
2a-83	H	
2a-84	CH_3	
2a-85	H	
2a-86	CH_3	
2a-87	H	

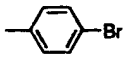
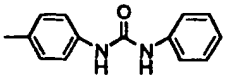
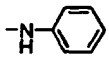
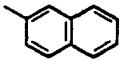
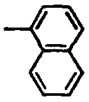
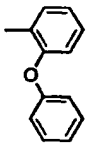
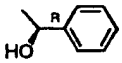
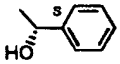
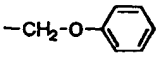
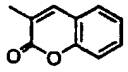
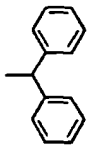


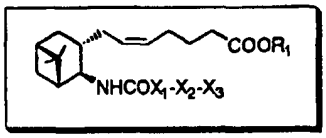
No.	R_1	X_1-X_2-X_3
2a-88	CH_3	
2a-89	H	
2a-90	CH_3	
2a-91	H	
2a-92	CH_3	
2a-93	H	
2a-94	CH_3	
2a-95	H	
2a-96	Na	
2a-97	$Ca^{1/2}$	
2a-98	CH_3	
2a-99	H	
2a-100	CH_3	
2a-101	H	
2a-102	CH_3	
2a-103	H	
2a-104	CH_3	
2a-105	H	
2a-106	CH_3	
2a-107	H	
2a-108	CH_3	
2a-109	H	
2a-110	Na	
2a-111	CH_3	
2a-112	H	

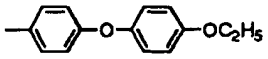
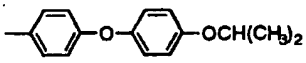
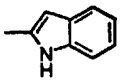
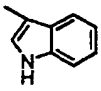
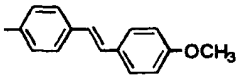
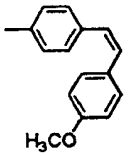
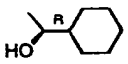
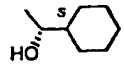
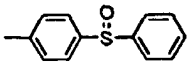
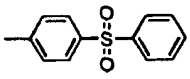
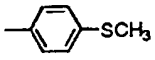


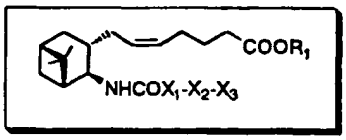
No.	R_1	X_1-X_2-X_3
2a-113	CH_3	
2a-114	H	
2a-115	CH_3	
2a-116	H	
2a-117	CH_3	
2a-118	H	
2a-119	H	
2a-120	H	
2a-121	H	
2a-122	H	
2a-123	H	
2a-124	H	
2a-125	H	

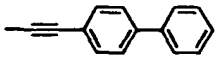
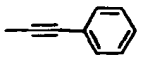
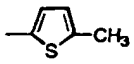
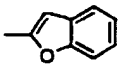
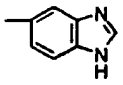
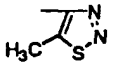
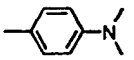


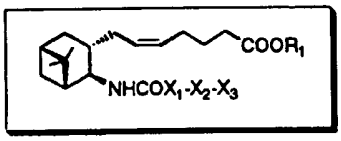
No.	R_1	X_1-X_2-X_3
2a-126	H	
2a-127	H	
2a-128	H	
2a-129	H	
2a-130	H	
2a-131	H	
2a-132	H	
2a-133	H	
2a-134	H	
2a-135	H	
2a-136	H	

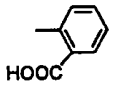
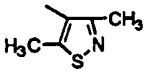
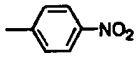
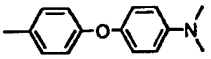
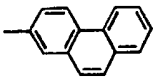
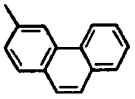
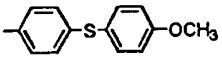
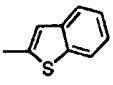


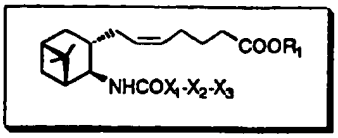
No.	R_1	X_1-X_2-X_3
2a-137	H	
2a-138	H	
2a-139	H	
2a-140	H	
2a-141	H	
2a-142	H	
2a-143	H	
2a-144	H	
2a-145	H	
2a-146	H	
2a-147	H	

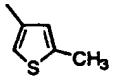
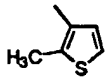
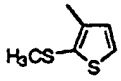
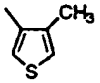
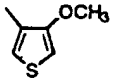
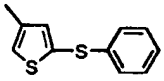
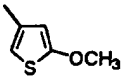
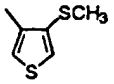
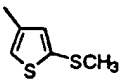


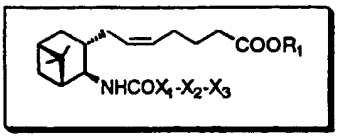
No.	R_1	X_1-X_2-X_3
2a-148	H	
2a-149	H	
2a-150	H	
2a-151	H	
2a-152	H	
2a-153	H	
2a-154	H	
2a-155	H	
2a-156	H	
2a-157	H	
2a-158	H	
2a-159	H	

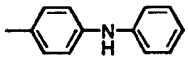
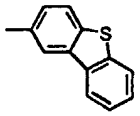
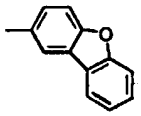
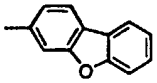
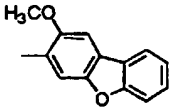
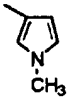
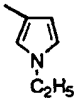


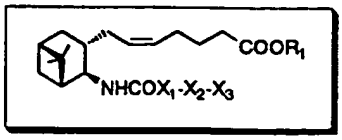
No.	R_1	X_1-X_2-X_3
2a-160	H	
2a-161	H	
2a-162	H	
2a-163	H	
2a-164	H	
2a-165	H	
2a-166	H	
2a-167	H	
2a-168	H	
2a-169	H	
2a-170	H	

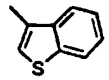
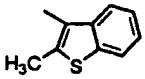
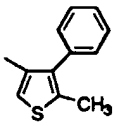
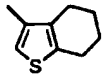
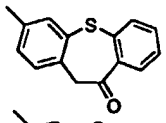
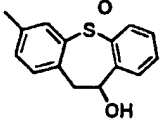
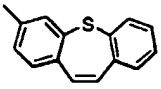
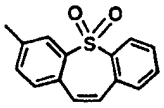
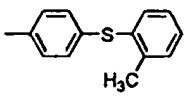


No.	R_1	X_1-X_2-X_3
2a-171	H	
2a-172	H	
2a-173	H	
2a-174	H	
2a-175	H	
2a-176	H	
2a-177	H	
2a-178	H	
2a-179	H	
2a-180	H	
2a-181	H	
2a-182	H	



No.	R_1	X_1-X_2-X_3
2a-183	H	
2a-184	H	
2a-185	H	
2a-186	H	
2a-187	H	
2a-188	H	
2a-189	H	
2a-190	H	
2a-191	H	
2a-192	H	
2a-193	H	



No.	R_1	X_1-X_2-X_3
2a-194	H	
2a-195	H	
2a-196	H	
2a-197	H	
2a-198	H	
2a-199	H	
2a-200	H	
2a-201	H	
2a-202	H	
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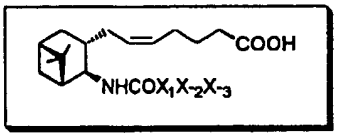
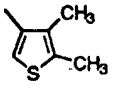
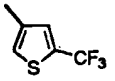
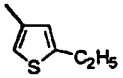
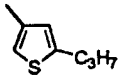
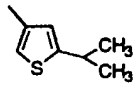
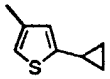
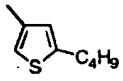
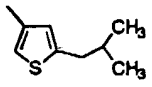
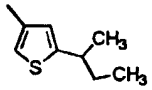
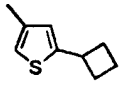
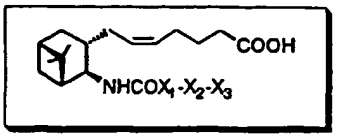
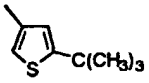
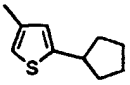
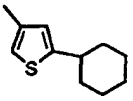
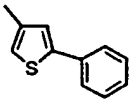
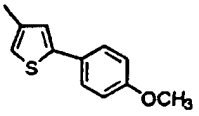
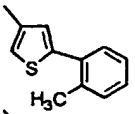
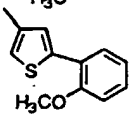
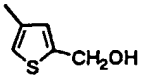
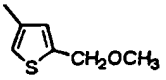
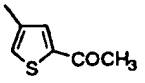
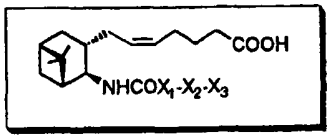
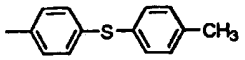
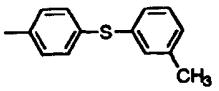
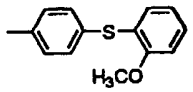
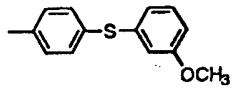
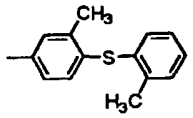
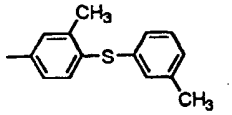
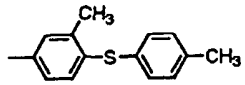
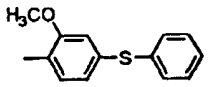
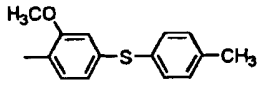
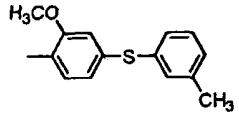


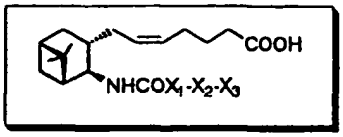
No.	X_1-X_2-X_3
2a-204	
2a-205	
2a-206	
2a-207	
2a-208	
2a-209	
2a-210	
2a-211	
2a-212	
2a-213	

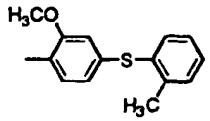
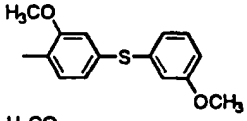
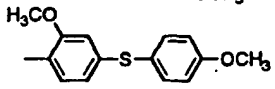
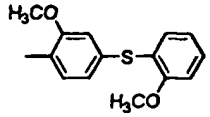
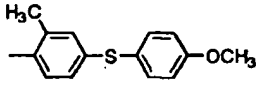
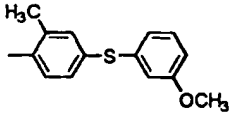
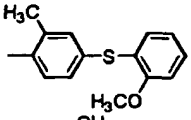
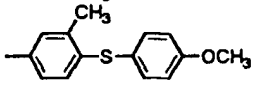
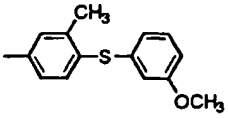
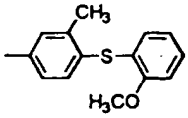


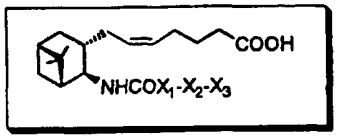
No.	X_1-X_2-X_3
2a-214	
2a-215	
2a-216	
2a-217	
2a-218	
2a-219	
2a-220	
2a-221	
2a-222	
2a-223	

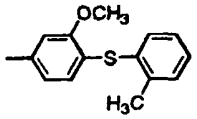
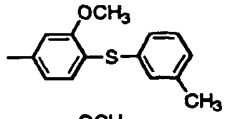
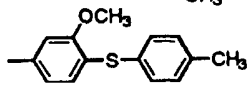
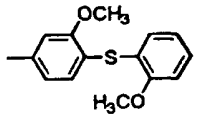
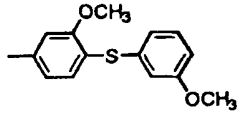
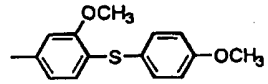
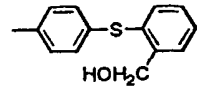
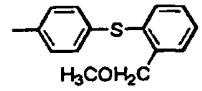


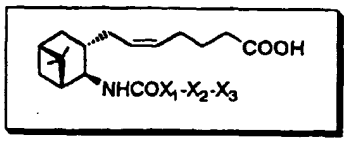
No.	X_1-X_2-X_3
2a-224	
2a-225	
2a-226	
2a-227	
2a-228	
2a-229	
2a-230	
2a-231	
2a-232	
2a-233	

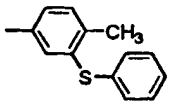
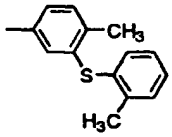
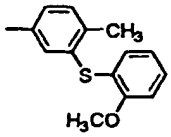
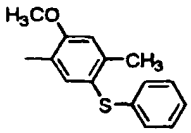
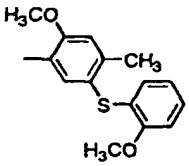
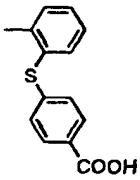


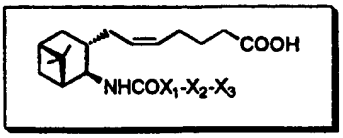
No.	X_1-X_2-X_3
2a-234	
2a-235	
2a-236	
2a-237	
2a-238	
2a-239	
2a-240	
2a-241	
2a-242	
2a-243	

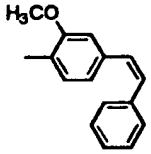
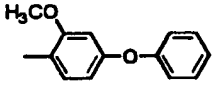
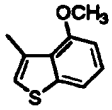
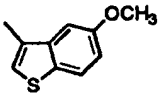
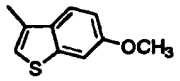
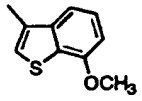
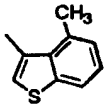
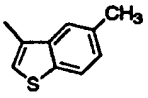
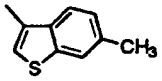
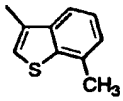


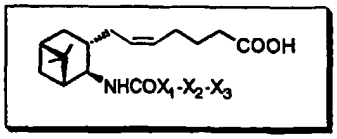
No.	X_1-X_2-X_3
2a-244	
2a-245	
2a-246	
2a-247	
2a-248	
2a-249	
2a-250	
2a-251	

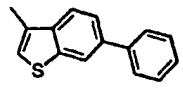
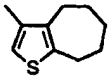
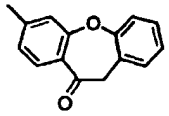
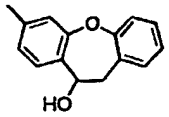
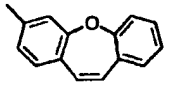
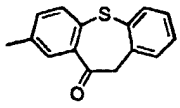
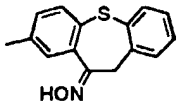
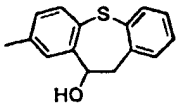
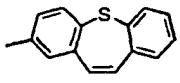


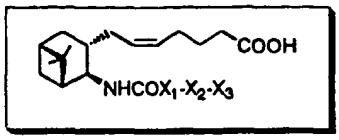
No.	X_1-X_2-X_3
2a-252	
2a-253	
2a-254	
2a-255	
2a-256	
2a-257	

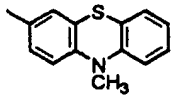
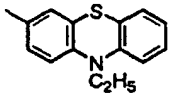
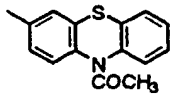
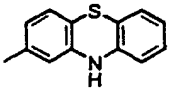
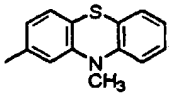
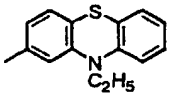
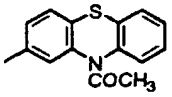
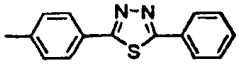
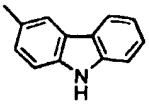
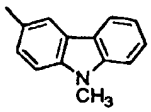


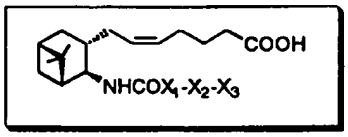
No.	X_1-X_2-X_3
2a-258	
2a-259	
2a-260	
2a-261	
2a-262	
2a-263	
2a-264	
2a-265	
2a-266	
2a-267	

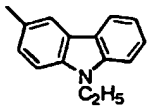
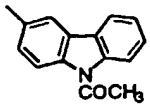
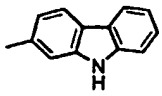
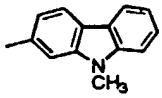
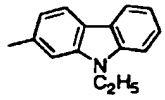
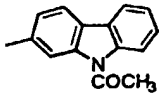
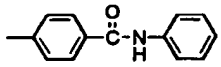
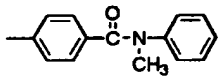
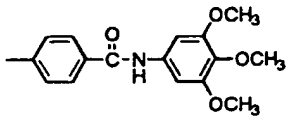


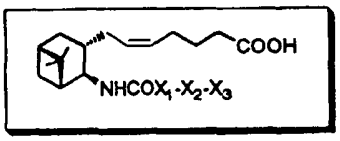
No.	X_1-X_2-X_3
2a-268	
2a-269	
2a-270	
2a-271	
2a-272	
2a-273	
2a-274	
2a-275	
2a-276	
2a-277	

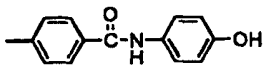
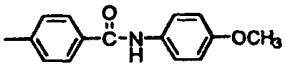
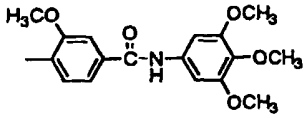
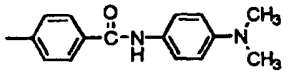
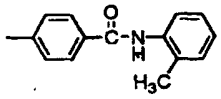
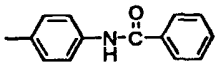
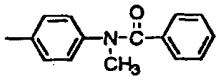
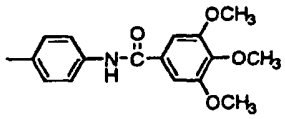
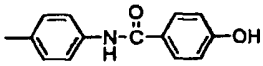
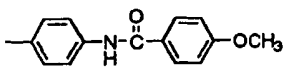


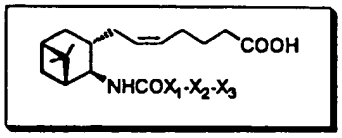
No.	X_1-X_2-X_3
2a-278	
2a-279	
2a-280	
2a-281	
2a-282	
2a-283	
2a-284	
2a-285	
2a-286	
2a-287	



No.	X_1-X_2-X_3
2a-288	
2a-289	
2a-290	
2a-291	
2a-292	
2a-293	
2a-294	
2a-295	
2a-296	



No.	X_1-X_2-X_3
2a-297	
2a-298	
2a-299	
2a-300	
2a-301	
2a-302	
2a-303	
2a-304	
2a-305	
2a-306	



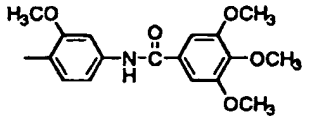
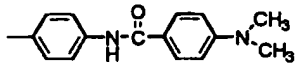
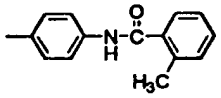
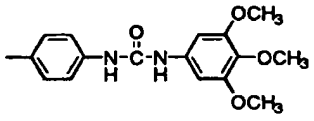
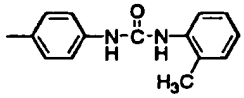
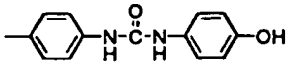
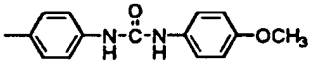
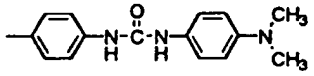
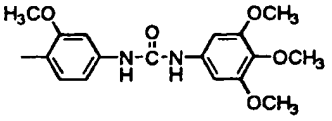
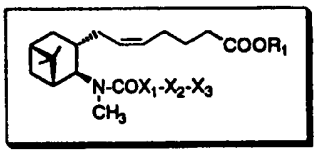
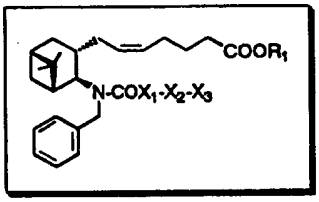
No.	X_1-X_2-X_3
2a-307	
2a-308	
2a-309	
2a-310	
2a-311	
2a-312	
2a-313	
2a-314	
2a-315	

Table 2b



No.	R_1	X_1-X_2-X_3
2b-1	H	
2b-2	H	

Table 2c



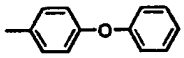
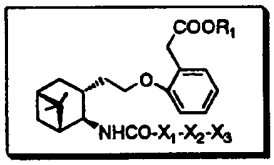
No.	R_1	X_1-X_2-X_3
2c-1	H	
2c-2	H	
2c-3	H	

Table 2d



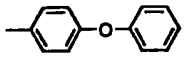
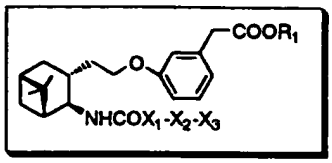
No.	R_1	X_1-X_2-X_3
2d-1	H	
2d-2	H	
2d-3	H	

Table 2e



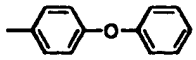
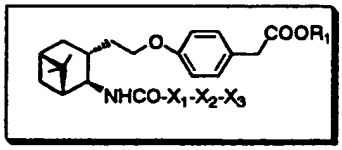
No.	R_1	X_1-X_2-X_3
2e-1	H	
2e-2	H	
2e-3	H	

Table 2f



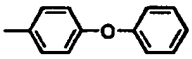
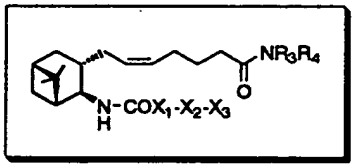
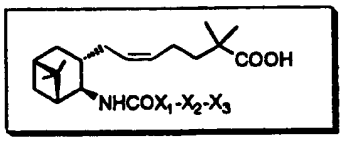
No.	R_1	X_1-X_2-X_3
2f-1	H	
2f-2	H	
2f-3	H	

Table 2g



No.	R_3	R_4	X_1-X_2-X_3
2g-1	H	SO_2CH_3	

Table 2h



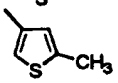
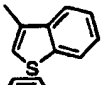
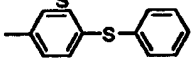
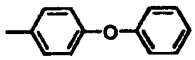
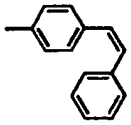
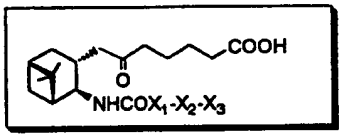
No.	X_1-X_2-X_3
2h-1	
2h-2	
2h-3	
2h-4	
2h-5	
2h-6	

Table 2i



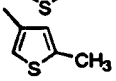
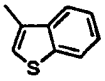
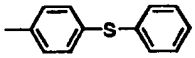
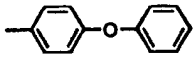
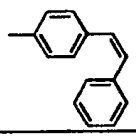
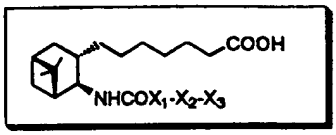
No.	X_1-X_2-X_3
2i-1	
2i-2	
2i-3	
2i-4	
2i-5	
2i-6	

Table 2j



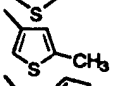
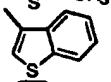
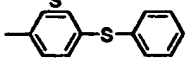
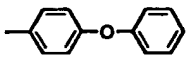
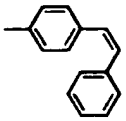
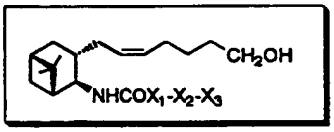
No.	X_1-X_2-X_3
2j-1	
2j-2	
2j-3	
2j-4	
2j-5	
2j-6	

Table 2k



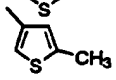
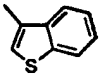
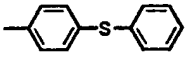
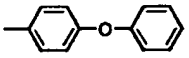
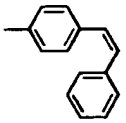
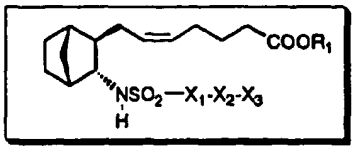
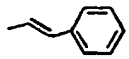
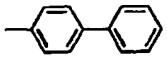
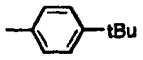
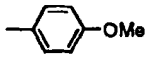
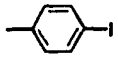
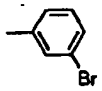
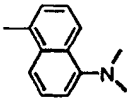
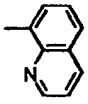
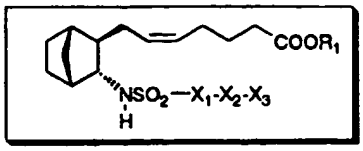
No.	X_1-X_2-X_3
2k-1	
2k-2	
2k-3	
2k-4	
2k-5	
2k-6	

Table 3a



No.	R_1	X_1-X_2-X_3
3a-1	CH_3	
3a-2	H	
3a-3	CH_3	
3a-4	H	
3a-5	$H_3N^+C(CH_2OH)_3$	
3a-6	Na	
3a-7	1/2 Ca	
3a-8	H	
3a-9	H	
3a-10	CH_3	
3a-11	H	
3a-12	CH_3	
3a-13	H	
3a-14	CH_3	
3a-15	CH_3	
3a-16	H	
3a-17	CH_3	
3a-18	H	



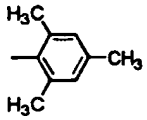
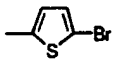
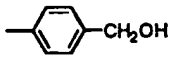
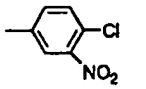
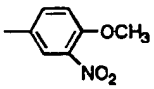
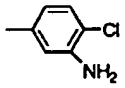
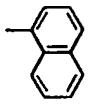
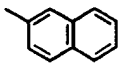
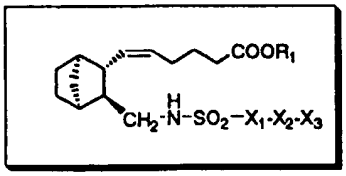
No.	R_1	X_1-X_2-X_3
3a-19	CH_3	
3a-20	H	
3a-21	CH_3	
3a-22	H	
3a-23	CH_3	
3a-24	H	
3a-25	H	$-(CH_2)_3CH_3$
3a-26	CH_3	$-(CH_2)_7CH_3$
3a-27	H	
3a-28	CH_3	
3a-29	H	
3a-30	CH_3	
3a-31	CH_3	
3a-32	H	
3a-33	Na	
3a-34	H	
3a-35	Na	

Table 3b



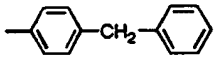
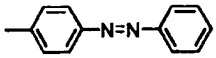
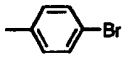
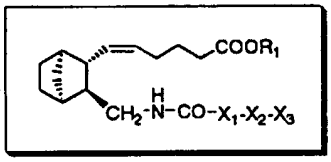
No.	R_1	X_1-X_2-X_3
3b-1	CH_3	
3b-2	H	
3b-3	H	
3b-4	H	

Table 3c



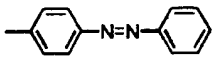
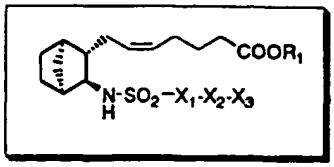
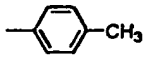
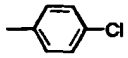
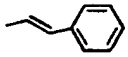
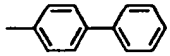
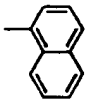
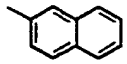
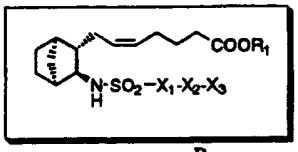
No.	R_1	X_1-X_2-X_3
3c-1	H	

Table 3d



No.	R_1	X_1-X_2-X_3
3d-1	1/2 Ca	
3d-2	Na	
3d-3	Na	
3d-4	Na	
3d-5	CH_3	
3d-6	H	
3d-7	CH_3	
3d-8	H	
3d-9	Na	
3d-10	CH_3	
3d-11	H	
3d-12	Na	
3d-13	1/2 Ca	
3d-14	H	
3d-15	Na	



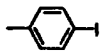
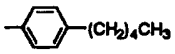
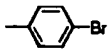
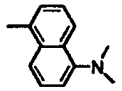
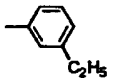
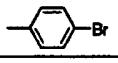
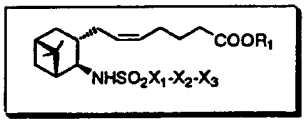
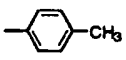
No.	R_1	X_1-X_2-X_3	
3d-16	H		
3d-17	H		
3d-18	H	$-(CH_2)_3CH_3$	
3d-19	CH_3		
3d-20	H	$-NHCH_3$	
3d-21	CH_3		
3d-22	H		
3d-23	H		
3d-24	H		
3d-25 3d-26	H Na		racemic compound
3d-27 3d-28	H Na		racemic compound
3d-29 3d-30	H Na		racemic compound

Table 3e



No.	R_1	X_1-X_2-X_3
3e-1	1/2Ca	

Physicochemical properties of compounds above are shown below. The compound number below corresponds to that described in Tables above.

No.1a — 4

$[\alpha]_D$= -11.5° ($CHCl_3$,c=1.01,23.5°C).

No.1a — 5

$[\alpha]_D$= -10.0° ($CHCl_3$,c=1.01,25.0°C).

No.1a — 6

$CDCl_3$ 300MHz
0.93-1.96(14H,m),2.20-2.26(3H,m),3.03(1H,m),3.67(3H,s),4.99(1H,d,J=6.6H z),5.10-5.24(2H,m),7.37-7.51(3H,m),7.54-7.64(3H,m),7.76-7.88(2H,m),8.11(1 H,m).
IR ($CHCl_3$):3384,3278,3026,2952,2874,1727,1436,1411,1324,1155,1097 /cm.
$[\alpha]_D$= -9.0° ($CHCl_3$,c=1.04,22.0°C).

No.1a — 7

$CDCl_3$ 300MHz
0.93-2.00(14H,m),2.18(1H,m),2.28(2H,t,J=7.2Hz),3.04(1H,m),5.15-5.25(2H,m), 5.28(1H,d,J=6.9Hz),7.36-7.50(3H,m),7.54-7.63(3H,m),7.76-7.89(2H,m), 8.12(1H,m) .
IR($CHCl_3$):3268,3028,2952,2872,1708,1452,1410,1324,1155,1097 /cm.
$[\alpha]_D$=-9.1° ($CHCl_3$,c=1.01,24.0°C).

No.1a — 8

$CDCl_3$ 300MHz
0.94-1.99(14H,m),2.21-2.29(3H,m),3.05(1H,m),3.67(3H,s),4.92(1H,d,J=6.3Hz), 5.14-5.30(2H,m),7.70-7.78(6H,m),7.96-8.01(2H,m).
IR($CHCl_3$):3376,3272,3018,2946,2868,1727,1616,1435,1388,1324,1162,1130, 1069 /cm.
$[\alpha]_D$= +1.6° ($CHCl_3$,c=1.01,24.0°C). mp.117-119°C.

No.1a — 9

$CDCl_3$ 300MHz
0.95-2.08(14H,m),2.19(1H,m), 2.32(2H,t,J=7.2Hz),3.06(1H,m),5.20-5.30(2H, m),5.34(1H,d,J=6.6Hz),7.69-7.78(6H,m),7.96-8.03(2H,m).
IR($CHCl_3$):3260,3020,2950,2868,1708,1389,1324,1162,1130,1069 /cm.
$[\alpha]_D$= +13.3° ($CHCl_3$,c=1.05,24.0°C).
mp.118-120°C

No.1a — 10

$CDCl_3$ 300MHz
0.96-1.98(14H,m),2.15-2.32(3H,m),3.04(1H,m),3.66(3H,s),5.12-5.26(5H,m),7.67-7.78(4H,m),7.93-8.07(4H,m).
IR($CHCl_3$):3276,3018,2946,2868,1726,1595,1435,1341,1162,1095 /cm.
$[\alpha]_D$= -1.5° ($CHCl_3$,c=1.01,25.0°C).
mp.133-139°C.

No.1a — 11

CD_3OD 300MHz
1.05-1.98(14H,m),2.13-2.22(3H,m),2.97(1H,m),5.09-5.22(2H,m),7.85-7.92(4H,m),7.95-8.05(4H,m).
IR(KBr):3385,3261,3069,3003,2954,2872,1708,1596,1428,1413,1378,1343,1 326,1236,1186,1160,1096 /cm.
mp.144-146°C.

No.1a — 12

$CDCl_3$ 300MHz
0.96-1.96(14H,m),2.22-2.27(3H,m),3.03(1H,m),3.66(3H,s),3.87(3H,s),4.86(1 H,d,J=6.9Hz),5.18-5.24(2H,m),6.99-7.02(2H,m),7.55-7.66(2H,m),7.66-7.69(2 H,m),7.89-7.92(2H,m).
IR($CHCl_3$):3374,3270,3016,2948,2870,1726,1608,1518,1487,1458,1437,1248, 1157,1037.
$[\alpha]_D$=+4.2° ($CHCl_3$,c=1.01,24°C).
mp.85-87°C.

No.1a — 13

$CDCl_3$ 300MHz
0.97-1.99(14H,m),2.18(1H,m),2.30(2H,t,J=7.2Hz),3.04(1H,m),3.86(3H,s),5.1 8(1H,d,J=5.7Hz),5.23-5.26(2H,m),6.99-7.02(2H,m),7.55-7.58(2H,m),7.66-7.6 8(2H,m),7.89-7.92(2H,m).
IR($CHCl_3$):3380,3260,3020,2948,2868,1708,1608,1519,1487,1458,1306,1293, 1248,1156 /cm.
$[\alpha]_D$=+18.3° ($CHCl_3$,c=1.00,25.5°C) .

No.1a — 14

$CDCl_3$ 300MHz
0.98-2.00(14H,m),2.20(1H,m),2.25(2H,t,J=7.2Hz),3.02(1H,m),3.67(3H,s),4.8 5(1H,d,J=6.3Hz),5.19-5.25(2H,m),7.13(1H,dd,J=4.8,3.6Hz),7.39(1H,d,J=4.8 Hz),7.40(1H,d,J=3.6Hz),7.71-7.74(2H,m),7.86-7.89(2H,m).
IR($CHCl_3$):3374,3270,3018,2946,2868,1727,1593,1434,1322/cm.
$[\alpha]_D$= +5.6° ($CHCl_3$,c=1.01,24°C).
mp.69-71°C.

No.1a — 15

$CDCl_3$ 300MHz
0.95-2.00(14H,m),2.17(1H,m),2.32(2H,t,J=7.2Hz),3.03(1H,m),5.20(1H,d,J=6. 9Hz),5.24-5.28(2H,m),7.13(1H,dd,J=4.8,3.3Hz),7.38(1H,d,J=4.8Hz),7.43(1H, d,J=3.3Hz),7.73(2H,d,J=8.4Hz),7.87(2H,d,J=8.4Hz).
IR($CHCl_3$):3260,3022,2948,2868,1709,1593,1404,1321,1154/cm.
$[\alpha]_D$= +20.8° ($CHCl_3$,c= 1.07,23°C).
mp.71-73°C.

No.1a — 16

$CDCl_3$ 300MHz
0.98-2.00(14H,m),2.27(2H,t,J=7.5Hz),2.28(1H,m),3.13(1H,m),3.66(3H,s),4.9 0(1H,d,J=6.9Hz),5.25-5.29(2H,m),7.40-7.65(6H,m),7.76(1H,d,J=8.4Hz),7.90-8.02(4H,m).
IR($CHCl_3$):3376,3276,3018,2946,2868,1726,1593,1435,1394,1322,1159/cm.
$[\alpha]_D$= +7.0° ($CHCl_3$,c=1.07,24°C).

No.1a — 17

$CDCl_3$ 300MHz
1.02-2.07(14H,m),2.25(1H,m),2.34(2H,t,J=6.6Hz),3.14(1H,m),5.28-5.33(3H, m),7.39-7.57(4H,m),7.62-7.65(2H,m),7.76(1H,d,J=8.1Hz),7.89-8.02(4H,m).
IR($CHCl_3$):3260,2948,2868,1709,1593,1394,1324,1157/cm.
$[\alpha]_D$=+20.2° ($CHCl_3$,c=1.02,24°C).

No.1a — 18

$CDCl_3$ 300MHz
1.05-1.97(14H,m),2.25(2H,t,J=7.2Hz),2.33(1H,m),3.12(1H,m),3.67(3H,s),4.9 1(1H,d,J=6.6Hz),5.24-5.29(2H,m),7.24(1H,d,J=3.9Hz),7.39-7.45(3H,m),7.56(1H,d,J=3.9Hz),7.59-7.62(2H,m).
IR($CHCl_3$):3372,3272,,3018,2946,2868,1727,1433,1331,1152/cm.

$[\alpha]_D$=-5.7° ($CHCl_3$,c=1.01,23°C).

No.1a — 19

$CDCl_3$ 300MHz
1.05-2.05(14H,m),2.28-2.33(3H,m),3.13(1H,m),5.18(1H,d,J=6.3Hz),5.27-5.31 (2H,m),7.24(1H,d,J=4.2Hz),7.39-7.42(3H,m),7.56(1H,d,J=4.2Hz),7.58-7.62(2 H,m).
IR($CHCl_3$):3372,3254,3018,2948,2868,1707,1431,1328,1151/cm.
$[\alpha]_D$= +4.5° ($CHCl_3$,c=1.01,21.5°C).

No.1a — 20

$CDCl_3$ 300MHz
1.05-2.00(14H,m),2.26(2H,t,J=7.5Hz),2.33(1H,m),3.11(1H,m),3.68(3H,s),4.9
2(1H,d,J=6.0Hz),5.27(2H,m),7.05(1H,m),7.10(1H,d,J=3.6Hz),7.25(1H,m),7.3 2(1H,m),7.49(1H,d,J=3.6Hz).
IR($CHCl_3$):3372,3272,3018,2946,2686,1727,1438,1417,1333,1151/cm.
$[\alpha]_D$=-9.2° ($CHCl_3$,c=1.01,25°C).

No.1a — 21

$CDCl_3$ 300MHz
1.02-2.01(14H,m),2.28-2.34(3H,m),3.13(1H,m),5.12(1H,d,J=6.9Hz),5.28-5.32
(2H,m),7.06(1H,m),7.10(1H,d,J=3.9Hz),7.25(1H,m),7.32(1H,m),7.50(1H,d,J =3.9Hz).
IR($CHCl_3$):3350,3250,2948,1709,1440,1420,1330,1151.
$[\alpha]_D$=+2.5° ($CHCl_3$,c=1.00,25°C).

No.1a — 22

$CDCl_3$ 300MHz
0.96-2.05(14H,m),2.25(1H,m),2.35(2H,t,J=7.0Hz),3.11(1H,m),5.20-5.34(2H, m),5.41(1H,d,J=6.6Hz),7.31-7.49(5H,m)7.62(1H,d,J=7.8Hz),8.11(1H,d.d,J= 1.8 and 7.8Hz),8.35(1H,d,J=1.8Hz).
IR($CHCl_3$):3384,3271,3025,2958,1708,1608,1559,1537,1357,1168/cm.
$[\alpha]_D$=+18.3° ($CHCl_3$,c=0.31,22°C).

No.1a — 23

$CDCl_3$ 300MHz
0.97-2.07(14H,m),2.24(1H,m),2.35(2H,t,J=6.9Hz),3.09(1H,m),3.86(3H,s),5.2 4-5.35(2H,m),5.44(1H,d,J=6.3Hz),6.97-7.00(2H,m),7.26-7.28(2H,m),7.59(1H, d,J=8.1Hz),8.06(1H,d.d,J=2.1 and 8.1Hz),8.29(1H,d,J=2.1Hz).
IR($CHCl_3$):3384,3270,2959,1709,1609,1535,1519,1357,1302,1255,1226,1169/cm.
$[\alpha]_D$=+17.0 ° ($CHCl_3$,c=1.00,21°C).

No.1No.1a — 24

$CDCl_3$ 300MHz
0.95-2.00(14H,m),2.20-2.25(1H,m),2.26(2H,t,J=7.2Hz),3.02-3.10(1H,m), 3.66(3H,s),4.92(1H,d,J=6.6Hz),5.16-5.31(2H,m),7.52-7.60(3H,m),7.94-8.06(6H,m).
IR($CHCl_3$):3376,3020,2946,2868,1726,1436,1366,1298,1164,1090,890/cm.
$[\alpha]_D$=+11.2±0.5 ° ($CHCl_3$,c=1.04,23.5°C)
mp.101-103°C

No.1a — 25

$CDCl_3$ 300MHz
0.95-2.08(14H,m),2.15-2.22(1H,m),2.33(2H,t,J=6.9Hz),3.02-3.10(1H,m), 5.21-5.31(2H,m),5.34(1H,d,J=6.3Hz),7.51-7.59(3H,m),7.92-8.07(6H,m).
IR($CHCl_3$):3258,3022,2948,2868,1707,1399,1328,1298,1163,1089,1051,892/cm.

$[\alpha]_D$=+29.8±0.7 ° ($CHCl_3$,c=1.05,25°C)
mp.158-160°C

No.1a —26

Anal. Calcd for $C_{26}H_{30}N_3O_4SNa$ $0.8H_2O$: C,60.29;H,6.15;N,8.11;S,6.19;Na, 4.44; Found: C,60.15;H,6.19;N,8.15;S,6.03;Na,4.98.
$[\alpha]_D$= -16.6° ($CHCl_3$,c=1.04,25.0°C).

No.1a —27

$CDCl_3$ 300MHz
0.92-1.98(14H,m),2.20(1H,m),2.26(2H,t,J=7.5Hz),3.03(1H,m),3.12(6H,s),3.6 6(3H,s),4.87(1H,d,J=6.6Hz),5.16-5.32(2H,m),6.73-6.80(2H,m),7.88-8.00(6H, m).
IR($CHCl_3$):3376,3020,2946,1726,1601,1518,1442,1419,1362,1312,1163,1133, 1088 /cm.
$[\alpha]_D$=+55.3° ($CHCl_3$,c=0.53,24.0°C).
mp.158-168°C

No.1a —28

$CDCl_3$+CD_3OD 300MHz
0.99-2.14(14H,m),2.21(1H,m),2.31(2H,t,J=7.2Hz),2.94(1H,m), 3.12(6H,s),5.22-5.38(2H,m),6.73-6.81(2H,m),7.87-8.00(6H,m).
IR(KBr):3434,3309,2946,1708,1604,1520,1442,1416,1366,1312,1252,1164,1 155,1134,1091 /cm.
$[\alpha]_D$= not measurable (colored, insufficient energy)
mp.193-196°C

No.1a —29

CD_3OD 300MHz
1.02-1.96(14H,m),2.10(2H,t,J=7.8Hz),2.16(1H,m),2.98(1H,m),3.11(6H,s), 5.07-5.27(2H,m),6.80-6.87(2H,m),7.84-8.00(6H,m).
IR(KBr):3433,3087,3004,2949,2871,1604,1565,1520,1444,1420,1364,1312,1 253,11638,1136,1090 /cm.
$[\alpha]_D$= not measurable

No.1a —30

$CDCl_3$ 300MHz
0.95-1.99(14H,m),2.22(1H,m),2.26(2H,t,J=7.2Hz),2.35(3H,s),3.06(1H,m),3.6 6(3H,s),4.95(1H,d,J=6.9Hz),5.15-5.30(2H,m),7.26-7.32(2H,m),7.97-8.06(6H, m).
IR($CHCl_3$):3374,2996,2946,2868,1763,1728,1591,1495,1435,1368,1299,1228, 1192,1163,1139 /cm.
$[\alpha]_D$=+12.9° ($CHCl_3$,c=1.04,26.0°C).

No.1a —31

$CDCl_3$ 300MHz
0.93-2.01(14H,m),2.19(1H,m),2.31(2H,t,J=7.2Hz),2.35(3H,s),3.06(1H,m), 5.17-5.32(2H,m),7.25-7.32(2H,m),7.96-8.07(6H,m).
IR($CHCl_3$):3267,3028,2952,2874,1759,1708,1592,1495,1368,1328,1299,1163, 1138,1088,1050,1008/cm.
$[\alpha]_D$=+21.7 ° ($CHCl_3$,c=0.51,22°C).

No.1a —32

$CDCl_3$ 300MHz
0.93-1.99(14H,m),2.21(1H,m),2.27(2H,t,J=7.2Hz),3.05(1H,m),3.67(3H,s),4.9 2(1H,d,J=6.6Hz)5.15-5.30(2H,m),6.72(1H,s),6.96-7.00(2H,m),7.86-8.04(6H, m).
IR($CHCl_3$):3374,3276,3018,2946,2686,1725,1605,1589,1502,1433,1396,1330, 1271,1164,1135,1089 /cm. $[\alpha]_D$= +18.6° ($CHCl_3$,c=1.00,26.0°C).

No.1a — 33

$CDCl_3$+CD_3OD 300MHz
0.98-2.08(14H,m),2.20(1H,m),2.28(2H,t,J=7.2Hz),2.98(1H,m),5.18-5.32(2H, m),6.92-6.99(2H,m),7.85-8.02(6H,m).
IR(KBr):3385,3248,2948,2876,1717,1601,1505,1430,1399,1296,1280,1219,1 165,1136,1092 /cm.
$[\alpha]_D$= -16.0° (CH_3OH,c=1.08,26.0°C).
mp.208-210°C

No.1a — 34

mp.82-83°C $[\alpha]_D$= +10.6° ($CHCl_3$,c=1.01,23.5°C).

No.1a — 35

mp.80-82°C $[\alpha]_D$= -1.8° ($CHCl_3$,c=1.07,22.0°C).

No.1a — 36

TLC Rf=0.25 (ethyl acetate/n-hexane = 1:1 (0.3% acetic acid))

No.1a — 37

$CDCl_3$ 300MHz
0.92-1.96(14H,m),2.21(1H,m),2.27(2H,t,J=7.4Hz),3.01(1H,m),3.66(3H,s),4.7 1(1H,d,J=6.6Hz),5.14-5.29(2H,m),7.12(1H,d,J=16.2Hz),7.24(1H,d,J=16.2Hz), 7.28-7.42(3H,m),7.52-7.56(2H,m),7.62(2H,d,J=8.7Hz),7.85(2H,d,J=8.7Hz).
IR($CHCl_3$):3384,3283,3023,2954,2876,1730,1595,1494,1317,1163,1147 /cm.
$[\alpha]_D$= +10.5° ($CHCl_3$,c=1.01,24°C).
mp 116-117 °C.

No.1a — 38

$CDCl_3$ 300MHz
0.92-1.99(14H,m),2.17(1H,m),2.32(2H,t,J=7.2Hz),3.02(1H,m),5.23-5.29(3H, m),7.11(1H,d,J=16.2Hz),7.23(1H,d,J=16.2Hz),7.28-7.41(3H,m),7.52-7.55(2H, m),7.61(2H,d,J=8.7Hz),7.86(2H,d,J=8.7Hz).
IR($CHCl_3$):3515,3384,3270,3022,3015,2957,2876,2669,1708,1595,1496,1320, 1157 /cm.
$[\alpha]_D$= +27.1° ($CHCl_3$,c=1.02,24°C).

No.1a — 39

$CDCl_3$ 300MHz
0.92-1.99(14H,m),2.15(1H,m),2.28(2H,t,J=7.4Hz),3.01(1H,m),3.68(3H,s),4.9 6(1H,d,J=6.6Hz),5.16-5.32(2H,m),6.60(1H,d,J=12.0Hz),6.74(1H,d,J=12.0Hz), 7.16-7.23(5H,m),7.35(2H,d,J=8.4Hz),7.72(2H,d,J=8.4Hz).
IR($CHCl_3$):3384,3283,3023,3015,2954,2876,1730,1595,1493,1324,1163,1147 /cm.
$[\alpha]_D$= +13.7° ($CHCl_3$,c=1.00,24°C).

No.1a — 40

$CDCl_3$ 300MHz
0.90-2.16(14H,m),2.12(1H,m),2.34(2H,t,J=7.2Hz),3.02(1H,m),5.16(1H,d,J=6. 9Hz),5.23-5.34(2H,m),6.60(1H,d,J=12.3Hz),6.74(1H,d,J=12.3Hz),7.14-7.24(5H,m),7.35(2H,d,J=8.1Hz),7.72(2H,d,J=8.1Hz).
IR($CHCl_3$):3515,3384,3269,3025,3021,3014,2957,2876,2668,1709,1595,1322, 1162,1147 /cm.
$[\alpha]_D$= +26.4° ($CHCl_3$,c=1.00,24°C).

No.1a —41

$CDCl_3$ 300MHz
0.98-1.99(14H,m),2.17(1H,m),2.32(2H,t,J=7.2Hz),3.00(1H,m),3.84(3H,s), 5.20-5.26(3H,m),6.90-6.95(2H,m),6.98(1H,d,J=16.2Hz),7.17(1H,d,J= 16.2Hz),7.46-7.49(2H,m),7.58(2H,d,J=8.4Hz),7.83(2H,d,J=8.4Hz).
IR($CHCl_3$):3258,3018,3002,2950,1709,1590,1509,1457,1404,1302,1250,1153 /cm.
$[\alpha]_D$= +30.2° ($CHCl_3$,c=1.00,23°C).
mp.99-100 °C

No.1a —42

$CDCl_3$ 300MHz
1.01-1.99(14H,m),2.28(2H,t,J=7.2Hz),2.30(1H,m),3.10(1H,m),3.66(3H,s),5.0 7(1H,br),5.25-5.30(2H,m),6.98-7.04(2H,m),7.16(1H,d,J=16.2Hz),7.28-7.37(3 H,m),7.47-7.50(3H,m).
IR($CHCl_3$):3372,3276,3020,2946,2870,1727,1491,1433,1331,1152 /cm.
$[\alpha]_D$= -11.5° ($CHCl_3$,c=1.07,21.5°C).

No.1a —43

$CDCl_3$ 300MHz
0.98-2.00(14H,m),2.11-2.36(3H,m),3.12(1H,m),5.10(1H,d,J=6.6Hz),5.29-5.32(2H,m),6.99-7.04(2H,m),7.23(1H,d,J=21.6Hz),7.32-7.49(6H,m).
IR($CHCl_3$):3380,3248,3020,2948,2868,1709,1491,1430,1329,1151/cm.
$[\alpha]_D$= +3.4° ($CHCl_3$,c=1.03,25°C).

No.1a —44

$CDCl_3$ 300MHz
1.00-2.00(14H,m),2.13(1H,m),2.29(2H,t,J=7.4Hz),2.90-3.13(5H,m),3.68(3H,s),4.74(1H,d,J=6.6Hz),5.15-5.30(2H,m),7.18-7.29(7H,m),7.76(2H,d,J=8.1Hz).
IR($CHCl_3$):3384,3282,3063,3028,3023,3016,2953,2876,1730,1599,1496,1319, 1157 /cm.
$[\alpha]_D$=+2.3° ($CHCl_3$,c=1.00,25°C).
mp.85.0-86.0°C

No.1a —45

$CDCl_3$ 300MHz
0.90-2.05(14H,m),2.09(1H,m),2.35(2H,t,J=6.9Hz),2.90-3.13(5H,m),5.18(1H, d,J=6.6Hz),5.24-5.34(2H,m),7.10-7.27(7H,m),7.76(2H,d,J=8.4Hz).
IR($CHCl_3$):3510,3384,3270,3087,3063,3026,3018,3014,2955,2876,2670,1708, 1599,1496,1318,1157/cm.
$[\alpha]_D$=+8.5° ($CHCl_3$,c=1.01,25°C).

No.1a —46

$[\alpha]_D$=+6.8° ($CHCl_3$,c=1.05,25°C). mp.99-100°C.

No.1a —47

$CDCl_3$ 300MHz
0.97-2.01(14H,m),2.14(1H,m),2.36(2H,t,J=7.2Hz),3.02(1H,m),5.23(1H,d,J=5. 4Hz),5.26-5.30(2H,m),7.37-7.39(3H,m),7.54-7.58(2H,m),7.63-7.66(2H,m),7.8 5-7.88(2H,m).
IR($CHCl_3$):3375,3260,3022,2948,2212,1707,1596,1497,1396,1322,1160/cm.
$[\alpha]_D$=+25.0° ($CHCl_3$,c=1.02,24°C). mp.117-118°C.

No.1a —48

CD_3OD 300MHz
1.05-1.93(14H,m),2.10-2.15(3H,m),2.96(1H,m),5.08-5.28(2H,m),7.38-7.40(3 H,m),7.554-

7.56(2H,m),7.69(1H,d,J=8.4Hz),7.87(1H,d,J=8.4Hz).

No.1a — 49

$CDCl_3$ 300MHz
0.96-1.97(14H,m),2.24(1H,m),2.31(2H,t,J=6.9Hz),3.05(1H,m),3.69(3H,s),5.1 5(1H,d,J=6.6Hz),5.25-5.27(2H,m),7.40-7.43(3H,m),7.61-7.64(2H,m),7.85(1H, d,J=8.1Hz),8.07(1H,dd,J=8.1,1.8Hz),8.58(1H,d,J=1.8Hz).
IR($CHCl_3$):3374,3020,2948,2870,2212,1726,1606,1530,1493,1437,1345,1167/cm.
$[\alpha]_D$=+2.4° ($CHCl_3$,c=1.03,25°C). mp.77-79°C.

No.1a — 50

$CDCl_3$ 300MHz
1.00-2.02(14H,m),2.20(1H,m),2.34(2H,t,J=6.6Hz),3.08(1H,m),5.26-5.29(2H, m),5.41(1H,d,J=6.9Hz),7.40-7.43(3H,m),7.61-7.64(2H,m),7.84(1H,d,J=8.1Hz),8.07(1H,dd,J=8.4,1.8Hz),8.57(1H,dd,J=1.8Hz).
IR($CHCl_3$):3380,3254,2952,2880,2212,1707,1606,1531,1493,1409,1344,1166.
$[\alpha]_D$=+23.4° ($CHCl_3$,c=1.00,25°C).

No.1a — 51

$CDCl_3$ 300MHz
0.95-1.98(14H,m),2.23(1H,m),2.30(2H,t,J=7.2Hz),3.00(1H,m),3.66(3H,s),4.5 6(2H,br),4.70(1H,d,J=6.9Hz),5.20-5.29(2H,m),7.15(1H,dd,J=7.8,1.8Hz),7.23 (1H,d,J=1.8Hz),7.36-7.39(3H,m),7.46(1H,d,J=7.8Hz),7.53-7.56(2H,m).
IR($CHCl_3$):3494,3386,3028,2952,2874,1725,1611,1559,1497,1422,1317,1162/cm.

No.1a — 52

$CDCl_3$ 300MHz
0.96-2.04(16H,m),2.20(1H,m),2.36(2H,t,J=6.9Hz),2.99(1H,m),5.17(1H,d,J=6. 3Hz),5.28-5.31(2H,m),7.18(1H,dd,J=9.6,1.8Hz),7.25(1H,m),7.36-7.39(3H,m), 7.46(1H,d,J=7.8Hz),7.52-7.56(2H,m).
IR($CHCl_3$):3482,3378,3260,3022,2948,2868,1708,161 2,1495, 1422, 1317/cm.
$[\alpha]_D$=+15.0° ($CHCl_3$,c=1.00,24°C).

No.1a — 53

$CDCl_3$ 300MHz
1.01-2.05(15H,m),2.31(2H,t,J=7.2Hz),3.10(1H,m),3.67(3H,s),5.02(1H,br),5.2 6-5.33(2H,m),7.18(1H,d,J=4.2Hz),7.36-7.39(3H,m),7.48(1H,d,J=4.2Hz),7.51-7.55(2H,m).
IR($CHCl_3$):3372,3270,3018,3004,2946,2868,2202,1726,1486,1433,1336,115 4/cm.
$[\alpha]_D$=+0.6° ($CHCl_3$,c=1.11,25°C), $[\alpha]_{436}$ +17.8° ($CHCl_3$,c=1.11,25°C).

No.1a — 54

$CDCl_3$ 300MHz
0.99-2.11(14H,m),2.27(1H,m),2.37(2H,t,J=7.5Hz),3.13(1H,m),5.16(1H,d,J=6. 6Hz),5.31-5.35(2H,m),7.18(1H,d,J=3.6Hz),7.37-7.39(3H,m),7.50(1H,d,J=3.6 Hz),7.52-7.55(2H,m).
IR($CHCl_3$):3484,3370,3246,2948,2868,2202,1708,1486,1429,1335,1153/cm.
$[\alpha]_D$=+17.8° ($CHCl_3$,c=1.00,24°C). mp.95-96°C

No.1a — 55

$CDCl_3$ 300MHz
0.95-1.92(14H,m),2.15(1H,m),2.24(2H,t,J=7.5Hz),3.00(1H,m),3.66(3H,s),5.1 0-5.30(3H,m),7.40-7.60(7H,m),7.70(1H,d,J=7.8Hz),8.08(1H,d,J=8.1Hz). IR ($CHCl_3$):3356,3020,2948,2868,2210,1727,1490,1458,1437,1341,1165/cm. $[\alpha]_D$=-58.4° ($CHCl_3$,c=1.00,26°C). mp.84-85°C.

No.1a — 56

$CDCl_3$ 300MHz
0.95-1.95(14H,m),2.10(1H,m),2.27(2H,t,J=6.9Hz),3.00(1H,m),5.17-5.21(2H, m),5.38(1H,d,J=6.9Hz),7.39-7.60(7H,m),7.70(1H,dd,J=7.8,1.5Hz),8.07(1H,J =6.6,1.5Hz).
IR($CHCl_3$):3364,3026,2952,2874,2212,1707,1597,1491,1458,1411,1341,1164/cm.
$[\alpha]_D$=-43.1° ($CHCl_3$,c=1.00,25°C).

No.1a — 57

$CDCl_3$ 300MHz
0.99-1.97(14H,m),2.23-2.30(3H,m),3.01(1H,m),3.67(3H,s),5.17-5.26(3H,m),7. 36-7.38(3H,m),7.50-7.56(3H,m),7.60(1H,m),7.83(1H,m),8.05(1H,m).
IR($CHCl_3$):3376,3020,2946,2870,1727,1598,1491,1437,1412,1330,1245,116 3/cm.
$[\alpha]_D$=-12.7° ($CHCl_3$,c=1.00,24°C).

No.1a — 58

$CDCl_3$ 300MHz
0.97-1.98(14H,m),2.20(1H,m),2.33(2H,t,J=6.9Hz),3.02(1H,m),5.19-5.28(3H, m),7.36-7.38(3H,m),7.47-7.55(3H,m),7.69(1H,m),7.83(1H,m),8.04(1H,m).
IR($CHCl_3$):3376,3260,3022,3002,2948,2868,2220,1708,1598,1490,1455,1412, 1327,1162/cm.
$[\alpha]_D$=-8.6° ($CHCl_3$,c=1.01,24°C).

No.1a — 59

$CDCl_3$ 300MHz
0.95-1.99(24H,m),2.20(1H,m),2.28(2H,t,J=7.8Hz),2.53(1H,s),2.96(1H,m),3.6 9(3H,s),4.99(1H,d,J=6.6Hz),5.18-5.20(2H,m),7.53(2H,d,J=8.4Hz),7.82(2H,d, J=8.4Hz).
IR($CHCl_3$):3583,3376,3002,2936,2852,1725,1591,1490,1437,1393,1325,116 0/cm.
$[\alpha]_D$=-8.8° ($CHCl_3$,c=1.00,24°C).

No.1a — 60

$CDCl_3$ 300MHz
0.96-2.05(24H,m),2.22(1H,m),2.33(2H,m),2.88(1H,m),5.22-5.26(2H,m),5.30(1H,d,J=5.7Hz),7.50(2H,d,J=8.7Hz),7.80(2H,d,J=8.7Hz).
IR($CHCl_3$):3376,3260,3022,2936,2852,1710,1592,1491,1452,1395,1325,1159/cm.
$[\alpha]_D$=-8.9° ($CHCl_3$,c=1.06,24°C),
mp.88-91°C

No.1a — 61

$CDCl_3$ 300MHz
0.95-2.24(23H,m),2.29(2H,m),2.99(1H,m),3.69(3H,s),4.76(1H,d,J=6.3Hz),5.2 1-5.24(2H,m),6.28(1H,m),7.50-7.53(2H,m),7.77-7.80(2H,m).
IR($CHCl_3$):3374,3270,3018,2942,2868,2196,1726,1589,1490,1435,1324,1158/cm.
$[\alpha]_D$=+7.7° ($CHCl_3$,c=1.02,24°C), mp.93-95°C

No.1a — 62

$CDCl_3$ 300MHz
0.96-2.45(23H,m),2.36(2H,d,J=6.9Hz),2.99(1H,m),5.24(1H,d,J=6.3Hz),5.24-5.32(2H,m),6.28(1H,m),7.50-7.53(2H,m),7.78-7.81(2H,m). IR($CHCl_3$):3468,3374,3260,3020,2942,2868,2196,1598,1490,1455,1398,1322,1157/cm.
$[\alpha]_D$=+19.4° ($CHCl_3$,c=1.03,24°C).

No.1a — 63

$CDCl_3$ 300MHz
0.93-1.95(25H,m),2.16(1H,m),2.29(2H,t,J=7.2Hz),2.43(2H,t,J=6.9Hz),2.94(1H,m),3.69(3H,s),4.95(1H,d,J=6.9Hz),5.21-5.24(2H,m),7.49(2H,d,J=8.7Hz),7. 79(2H,J=8.7Hz).
IR($CHCl_3$):3376,3018,2946,2866,2222,1727,1592,1456,1435,1325,1158/cm.
$[\alpha]_D$=+3.7° ($CHCl_3$,c=1.00,25°C).

No.1a — 64

$CDCl_3$ 300MHz
0.93-1.97(26H,m),2.35(2H,t,J=7.2Hz),2.43(2H,t,J=7.2Hz),3.00(1H,m),5.08(1 H,d,J=6.6Hz),5.26-5.27(2H,m),7.49(2H,d,J=8.7Hz),7.78(2H,d,J=8.7Hz).
IR($CHCl_3$):3260,3020,2948,2864,2222,1708,1592,1489,1456,1397,1324,1156/cm.
$[\alpha]_D$=+14.4° ($CHCl_3$,c=1.00,25°C) mp.70-71°C.

No.1a — 65

$CDCl_3$ 300MHz
0.95-1.98(14H,m),2.18(1H,m),2.30(2H,t,J=7.2Hz),3.00(1H,m),3.67(3H,s),4.8 3(1H,d,J=6.9Hz),5.22-5.25(2H,m),5.54(1H,br),6.82-6.85(2H,m),7.42-7.45(2H, m),7.59-7.62(2H,m),7.82-7.85(2H,m).
IR($CHCl_3$):3576,3374,3018,2946,2868,2208,1725,1607,1587,1514,1435,1325, 1270,1162,1133/cm.
$[\alpha]_D$=+9.1° ($CHCl_3$,c=1.03,24°C), mp.111-112°C

No.1a — 66

$CDCl_3$ 300MHz
0.97-2.03(14H,m),2.15(1H,m),2.35(2H,t,J=7.5Hz),3.00(1H,m),5.17(1H,d,J=6. 6Hz),5.26-5.30(2H,m),6.82-6.85(2H,m),7.42-7.45(2H,m),7.59-7.62(2H,m),7.8 2-7.85(2H,m).
IR($CHCl_3$):3260,2948,2870,2208,1709,1607,1587,1514,1396,1325,1270,1162, 1133/cm.
$[\alpha]_D$=-21.0° ($CHCl_3$,c=1.00,23°C), mp.161-162°C

No.1a — 67

$CDCl_3$ 300MHz
0.95-1.98(14H,m),2.20(1H,m),2.29(2H,t,J=7.2Hz),3.01(1H,m),3.67(3H,s),4.8 2(1H,d,J=6.6Hz),5.19-5.27(2H,m),7.05-7.10(2H,m),7.51-7.56(2H,m),7.61-7.6 4(2H,m),7.84-7.87(2H,m).
IR($CHCl_3$):3374,3280,3020,2946,2868,2214,1727,1589,1509,1435,1327,1233, 1161,1134/cm.
$[\alpha]_D$=+6.7° ($CHCl_3$,c=1.01,24°C), mp.84-85°C

No.1a — 68

$CDCl_3$ 300MHz
0.96-2.01(14H,m),2.15(1H,m),2.34(2H,t,J=6.9Hz),3.02(1H,m),5.23-5.27(3H, m),7.04-7.10(2H,m),7.51-7.56(2H,m),7.61-7.64(2H,m),7.85-7,88(2H,m).
IR($CHCl_3$):3374,3258,3020,2948,2868,2214,1708,1589,1509,1455,1398,1322, 1156/cm.
$[\alpha]_D$=+22.6° ($CHCl_3$,c=1.02,24°C), mp.135-136°C

No.1a — 69

$CDCl_3$ 300MHz
0.95-1.98(14H,m),2.19(1H,m),2.29(2H,t,J=7.2Hz),2.39(3H,s),3.01(1H,m),3.6 9(3H,s),4.80(1H,d,J=6.6Hz),5.20-5.29(2H,m),7.18(2H,d,J=8.1Hz),7.44(2H,d, J=8.1Hz),7.62(2H,d,J=8.4Hz),7.84(2H,d,J=8.4Hz).
IR($CHCl_3$):3374,3022,2946,2868,2210,1727,1589,1511,1436,1323,1161,1133/cm.
$[\alpha]_D$=+9.2° ($CHCl_3$,c=1.02,24°C).
mp.116-118°C

No.1a — 70

$CDCl_3$ 300MHz
1.15-2.00(14H,m),2.13(1H,m),2.33-2.38(5H,m),3.04(1H,m),5.14(1H,d,J=6.6 Hz),5.25-5.30(2H,m),7.17(2H,d,J=7.8Hz),7.44(2H,d,J=7.8Hz),7.62(2H,d,J=8. 4Hz),7.85(2H,d,J=8.4Hz).
IR($CHCl_3$):3380,3260,3020,2948,2868,2210,1708,1590,1511,1396,1324,1160, 1133/cm.
$[\alpha]_D$=+24.6° ($CHCl_3$,c=1.00,24°C).

No.1a — 71

$CDCl_3$ 300MHz
0.95-1.96(14H,m),2.19(1H,m),2.29(2H,t,J=7.2Hz),3.00(1H,m),3.20(1H,s),3.6 5(3H,s),4.81(1H,d,J=6.6Hz),5.20-5.27(2H,m),7.46-7.54(4H,m),7.62-7.65(2H, m),7.85-7.88(2H,m).
IR($CHCl_3$):3374,3290,3018,3002,2946,2868,2212,2110,1726,1591,1507,1435, 1401,1324,1161/cm.
$[\alpha]_D$=+9.6° ($CHCl_3$,c=1.01,24°C), mp.136-138°C,

No.1a — 72

$CDCl_3$ 300MHz
0.96-2.01(14H,m),2.14(1H,m),2.35(2H,t,J=7.2Hz),3.05(1H,m),3.20(1H,s),5.1 6(1H,d,J=7.2Hz),5.26-5.29(2H,m),7.45-7.53(4H,m),7.63(2H,d,J=8.4Hz),7.87(2H,d,J=8.4Hz).
IR($CHCl_3$):3462,3374,3290,3024,2948,2868,2212,2110,1708,1591,1508,1455, 1401,1321,1274,1160,1132/cm.
$[\alpha]_D$=+24.3° ($CHCl_3$,c=1.03,24°C), mp.96-99°C

No.1a — 73

$CDCl_3$ 300MHz
0.95-1.98(14H,m),2.19(1H,m),2.27-2.32(5H,m),3.01(1H,m),3.67(3H,s),4.80(1 H,d,J=6.6Hz),5.20-5.27(2H,m),7.12(2H,m),7.56(2H,m),7.63(2H,m),7.84(2H, m).
IR($CHCl_3$):3374,3276,3018,2946,2868,2214,1762,1730,1589,1506,1435,1368, 1161/cm.
$[\alpha]_D$=+7.8° ($CHCl_3$,c=1.02,24°C), mp.102-104°C

No.1a — 74

$CDCl_3$ 300MHz
0.95-2.05(14H,m),2.15(1H,m),2.32-2.37(5H,m),3.02(1H,m),5.14(1H,d,J=6.6 Hz),5.26-5.30(2H,m),7.10-7.13(2H,m),7.54-7.57(2H,m),7.62-7.64(2H,m),7.84 -7.87(2H,m).
IR($CHCl_3$):3482,3250,3022,2946,2868,2214,1716,1709,1589,1507,1454,1396, 1368,1322,1195,1161/cm.
$[\alpha]_D$=+15.0° ($CHCl_3$,c=1.00,24°C) mp.129-131°C

No.1a — 75

$CDCl_3$ 300MHz
0.95-1.99(14H,m),2.20(1H,m),2.30(2H,t,J=7.2Hz),3.02(1H,m),3.67(3H,s),3.9 4(3H,s),4.79(1H,d,J=6.6Hz),5.19-5.29(2H,m),7.60-7.63(2H,m),7.65-7.67(2H, m),7.86-7.89(2H,m),8.04-8.06(2H,m).
IR($CHCl_3$):3378,3018,2946,2880,1720,1604,1435,1307,1276,1161,1106 /cm.
$[\alpha]_D$=+7.3° ($CHCl_3$,c=1.01,25°C), mp.132-133°C

No.1a — 76

$CDCl_3$+CD_3OD 300MHz
1.04-2.05(14H,m),2.19(1H,m),2.32(2H,t,J=6.9Hz),2.93(1H,m)5.27-5.31(2H, m),7.60-7.63(2H,m),7.65-7.68(2H,m),7.86-7.89(2H,m),8.05-8.07(2H,m).
IR($CHCl_3$):3402,3299,2955,2876,2665,2549,1455,1422,1313,1281,1164 /cm.
$[\alpha]_D$=-21.1° (CH_3OH,c=1.03,23°C), mp.227-229(dec.)

No.1a — 77

$CDCl_3$ 300MHz
0.96-1.99(14H,m),2.20(1H,m),2.30(2H,t,J=7.2Hz),3.02(1H,m),3.68(3H,s),4.8 8(1H,d,J=6.3Hz),5.19-5.29(2H,m),7.67-7.72(4H,m),7.89-7.91(2H,m),8.24-8.2 7(2H,m).
IR($CHCl_3$):3376,3276,3020,2946,2870,2214,1726,1594,1519,1455,1435,138 9,1344,1161/cm.
$[\alpha]_D$=+7.7° ($CHCl_3$,c=1.02), mp.87-89°C

No.1a — 78

$CDCl_3$ 300MHz
0.98-2.00(14H,m),2.18(1H,m),2.34(2H,t,J=7.2Hz),3.02(1H,m),5.24-5.28(2H, m),5.32(1H,d,J=5.7Hz),7.67-7.72(4H,m),7.89-7.92(2H,m),8.23-8.26(2H,m).
IR($CHCl_3$):3374,3260,2948,2214,1708,1595,1344,1160/cm.
$[\alpha]_D$=+23.3° ($CHCl_3$,c=1.00), mp.102-103°C.

No.1a — 79 $CDCl_3$ 300MHz
0.93-2.02(14H,m),2.13(1H,m),2.36(2H,t,J=7.1Hz),3.05(1H,m),3.84(3H,s),5.1 8(1H,br),5.27-5.31(2H,m),6.88-6.91(2H,m),7.48-7.50(2H,m),7.60-7.63(2H,m) 7.83-7.85(2H,m).
IR($CHCl_3$):3380,3252,3020,2950,2868,2208,1708,1589,1511,1457,1396,1321, 1286,1160/cm.
$[\alpha]_D$=+26.7° ($CHCl_3$,c=1.00). mp.75-77°C

No.1a — 80

$CDCl_3$ 300MHz
0.96-1.99(14H,m),2.21(1H,m),2.30(2H,t,J=7.8Hz),3.02(1H,m),3.68(3H,s),4.8 0(1H,d,J=6.6Hz),5.19-5.28(2H,m),7.51-7.77(5H,m),7.87-7.90(2H,m),8.13(1H, m).
IR($CHCl_3$):3374,3270,3018,2946,2868,2216,1726,1607,1567,1527,1495,1456, 1436,1344,1296,1161/cm.
$[\alpha]_D$=+7.4° ($CHCl_3$,c=1.00,22°C), mp.68-70°C

No.1a — 81

$CDCl_3$ 300MHz
0.97-2.01(14H,m),2.16(1H,m),2.34(2H,t,J=7.2Hz),3.01(1H,m),5.22-5.28(3H, m),7.51(1H,m),7.65(1H,m)7.70-7.76(3H,m),7.88-7.91(2H,m),8.12(1H,dd,J=6. 9Hz,1.5Hz).
IR($CHCl_3$):3480,3382,3262,3026,2952,2872,2218,1708,1607,1567,1526,1396, 1343,1225,1160/cm.
$[\alpha]_D$=+22.0° ($CHCl_3$,c=1.00), mp.92-94°C

No.1a — 82

$CDCl_3$ 300MHz
0.95-1.98(14H,m),2.20(1H,m),2.29(2H,t,J=7.2Hz),3.01(1H,m),3.67(3H,s),4.3 0(2H,br),4.79(1H,d,J=6.9Hz),5.20-5.29(2H,m),6.71-6.76(2H,m),7.18(1H,m),7. 37(1H,dd,J=7.8,1.2Hz),7.61-7.65(2H,m),7.83-7.87(2H,m).
IR($CHCl_3$):3376,3020,2946,2868,2202,1725,1613,1589,1484,1454,1315,1253, 1161/cm.
$[\alpha]_D$=+8.9° ($CHCl_3$,c=1.00,22°C). mp.68-70°C

No.1a — 83

$CDCl_3$ 300MHz
0.97-1.99(14H,m),2.17(1H,m),2.33(2H,t,J=6.9Hz),2.99(1H,m),5.20-5.28(2H, m),5.37(1H,d,J=6.9Hz),6.45(2H,br),6.71-6.76(2H,m),7.19(1H,dd,J=7.8,6.6Hz),7.37(1H,m),7.62(2H,d,J=8.4Hz),7.85(2H,d,J=8.4Hz).
IR($CHCl_3$):3478,3378,3260,3022,2950,2868,2204,1708,1613,1589,1484,1454, 1396,1316,1160/cm.
$[\alpha]_D$=+17.1° ($CHCl_3$,c=1.01).

No.1a — 84

$CDCl_3$ 300MHz

1.00-2.08(14H,m),2.21(1H,m),2.37(2H,t,J=6.9Hz),3.06(1H,m),3.86(3H,s),5.2 9-
5.33(2H,m),5.45(1H,d,J=6.6Hz),6.91-6.94(2H,m),7.56-7.59(2H,m),7.81(1H,
d.t,J=8.1Hz),8.04(1H,d.d,J=8.1&1.8Hz),8.57(1H,d,J=2.1Hz).
IR($CHCl_3$):3492,3254,3028,2954,2202,1708,1597,1512,1344,1291,1250/cm.
$[\alpha]_D$=+27.4° ($CHCl_3$,c=0.53,23°C).

No.1a — 85

$CDCl_3$ 300MHz
0.96-2.05(14H,m),2.20(1H,m),2.35(2H,t,J=6.9Hz),2.99(1H,m),3.84(3H,s),5.2 2-
5.31(3H,m),6.89(2H,d,J=8.7Hz),7.19(1H,brs),7.29(1H,brs),7.45-7.50(3H,m
IR($CHCl_3$):3478,3378,3020,2950,2868,2202,1708,1606,1511,1421,1311,128 7,1248,1155/cm.
$[\alpha]_D$=+17.1° ($CHCl_3$,c=1.00,23°C).

No.1a — 86

$CDCl_3$ 300MHz
1.03-2.05(14H,m),2.21(1H,m),2.37(2H,t,J=6.9Hz),3.04(1H,m),529-5.33(2H, m),5.57(1H,d,J=6.3Hz),6.84-
6.87(2H,m)7.50-7.53(2H,m),7.79(1H,d,J=8.1Hz),8.03(1H,d,d,J=1.5and8.1Hz),8.57(1H,d,J=1.5Hz).
IR($CHCl_3$):3250,3024,2950,2868,2200,1707,1515,1344,1271,1166,1143/cm.
$[\alpha]_D$=+21.2° ($CHCl_3$,c=0.26,22°C).

No.1a — 87

CD_3OD 300MHz
1.04-2.00(14H,m),2.18(1H,m),2.26(2H,t,J=5.4Hz),2.93(1H,m),5.19-5.24(2H, m),6.77-
6.80(2H,m),7.05(1H,d.d,J=2.1and8.1Hz),7.22(1H,d,J=2.1Hz),7.38-7. 42(3H,m).
IR($CHCl_3$):3377,2952,2873,2204,1705,1607,1515,1425,1312,1267,1222,115 3/cm.
$[\alpha]_D$=-15.6° (CH_3OH,c=1.02,22°C).

No.1a — 88

$CDCl_3$ 300MHz
0.90-1.96(14H,m),2.22-2.31(3H,m),2.95(1H,m),3.65(3H,s),4.87(1H,d,J=6.6H z),5.13-5.28(2H,m),7.46-
7.62(3H,m),7.82-7.89(4H,m),7.90-7.96(2H,m),8.42(1 H,brs).
IR($CHCl_3$):3376,3016,2946,2868,1720,1677,1592,1514,1498,1429,1376,1314, 1241,1156,1094 /cm.
$[\alpha]_D$= -10.7° ($CHCl_3$,c=1.04,22.0°C) mp.134-136°C

No.1a — 89

$CDCl_3$+CD_3OD 300MHz
0.96-2.08(14H,m),2.23(1H,m),2.28(2H,t,J=7.2Hz),2.89(1H,m),5.20-5.32(2H, m),7.46-7.62(3H,m),7.82-
7.97(6H,m).
IR(KBr):3272,3007,2952,2874,1708,1660,1592,1527,1498,1433,1400,1317,1 260,1152,1094 /cm.
$[\alpha]_D$= -24.4° (CH_3OH,c=1.02,25.0°C).

No.1a — 90

$CDCl_3$ 300MHz
0.89-1.96(14H,m),2.23-2.33(3H,m),2.92(1H,m),3.67(3H,s),4.85(1H,d,J=6.3H z),5.10-5.25(2H,m),7.81-
7.90(4H,m),8.10-8.18(2H,m),8.31-8.40(2H,m),8.77(1 H,s).
IR($CHCl_3$):3372,3018,2946,2868,1718,1685,1592,1527,1436,1397,1346,1318, 1256,1154,1099 /cm.
$[\alpha]_D$= -16.1° ($CHCl_3$,c=1.00,23.0°C).

No.1a — 91

$CDCl_3$+CD_3OD 300MHz
0.94-2.02(14H,m),2.18-2.36(3H,m),2.87(1H,m),5.15-5.30(2H,m),7.82-7.92(4 H,m),8.09-8.16(2H,m),8.30-

8.37(2H,m).
IR(KBr):3284,3112,3006,2952,2874,1707,1593,1528,1498,1399,1348,1320,1 259,1153,1093 /cm.
$[\alpha]_D$= -26.3° (CH_3OH,c=1.01,22°C).

No.1a — 92

$CDCl_3$ 300MHz
0.93-1.95(14H,m),2.22-2.31(3H,m),2.98(1H,m),3.68(3H,s),5.07(1H,d,J=6.9H z),5.10-5.24(2H,m),7.18(1H,m),7.35-7.43(2H,m),7.70(2H,d,J=7.8Hz),7.88-8. 05(4H,m),8.50(1H,brs),
IR($CHCl_3$):3382,3008,2952,1720,1675,1599,1525,1499,1438,1321,1253,1161, 1087 /cm.
$[\alpha]_D$= -16.6° ($CHCl_3$,c=1.03,24.0°C) mp.100-101°C

No.1a — 93

$CDCl_3$+CD_3OD 300MHz
0.96-2.00(14H,m),2.18-2.35(3H,m),2.90(1H,m),5.15-5.30(2H,m),7.18(1H,m), 7.33-7.42(2H,m),7.65-7.74(2H,m),7.90-8.08(4H,m).
IR(KBr):3347,3194,3011,2955,2875,1706,1650,1602,1544,1499,1443,1325, 1265,1165,1091 /cm.
$[\alpha]_D$= -19.4° (CH_3OH,c=1.00,24.0°C) mp.158-159°C

No.1a — 94

CD_3OD 300MHz
1.05-2.00(14H,m),2.14(1H,m),2.23(2H,t,J=7.2Hz),2.98(1H,m),3.80(3H,s),5.1 3-5.27(2H,m),6.88-6.98(2H,m),7.54-7.64(2H,m),7.94-8.12(4H,m).
IR(KBr):3370,3006,2953,1708,1649,1604,1541,1512,1460,1441,1414,1328,1 302,1248,1162,1107,1090,1032/cm.
$[\alpha]_D$= -19.1° (CH_3OH,c=1.01,24°C).

No.1a — 95

CD_3OD 300MHz
1.04-2.02(14H,m),2.14(1H,m),2.23(2H,t,J=7.2Hz),2.93-3.02(7H,m),5.13-5.27 (2H,m),6.82-6.92(2H,m),7.51-7.59(2H,m),7.95-8.02(2H,m),8.04-8.11(2H,m).
IR(KBr):3370,3006,2953,1708,1649,1604,1541,1512,1460,1441,1414,1328,1 302,1248,1162,1107,1090,1032/cm.
$[\alpha]_D$=-17.6° (CH_3OH,c=1.01,24°C).

No.1a — 96

CD_3OD 300MHz
1.05-2.02(14H,m),2.14(1H,m),2.23(2H,t,J=7.2Hz),2.98(1H,m),5.13-5.27(2H, m),6.75-6.84(2H,m),7.43-7.52(2H,m),7.94-8.12(4H,m).
IR(KBr):3339,3197,2953,2875,1707,1644,1606,1541,1514,1446,1325,1293,1 259,1240,1225,1161,1091/cm.
$[\alpha]_D$= -18.7° (CH_3OH,c=1.00,24°C). mp.193-196°C

No.1a — 97

d_6-DMSO 300MHz
1.05-2.08(15H,m),2.15(2H,t,J=7.5Hz),2.89(1H,m),5.18-5.28(2H,m),6.78-7.12 (3H,m),7.73(1H,d.d,J=1.4and7.8Hz),7.91-7.95(3H,m),8.14(2H,d,J=8.4Hz),9. 71(1H,s).
IR(KBr):3407,3191,2953,1711,1646,1614,1603,1537,1457,1326,1162,1151/cm.
$[\alpha]_D$=-20.7° (CH_3OH,c=1.01,21°C).

No.1a — 98

$CDCl_3$ 300MHz
0.93-2.00(14H,m),2.21(1H,m),2.31(2H,t,J=7.2Hz),2.93(1H,m),3.84(3H,s),3.8 5(6H,s),5.15-

5.30(2H,m),5.45(1H,d,J=6.3Hz),7.04(2H,s),7.78-7.86(2H,m),7.9 0-7.98(2H,m),8.58(1H,s).
IR($CHCl_3$):3264,3008,2954,2874,1707,1670,1607,1537,1506,1451,1421,1308, 1158,1129,1086/cm.
$[\alpha]_D$= -7.2° ($CHCl_3$,c=1.01,23.5°C). mp.147-149°C.

No.1a — 99

CD_3OD 300MHz
1.04-1.98(14H,m),2.21(1H,m),2.10(2H,t,J=7.2Hz),2.95(1H,m),3.76(3H,s),3.8 6(6H,s),5.07-5.24(2H,m),7.19(2H,s),7.99(2H,d,J=8.7Hz),8.13(1H,d,J=8.7Hz).
IR(KBr):3354,3002,2950,2874,1656,1607,1570,1508,1452,1413,1314,1233,1 185,1157,1127,1092/cm.
$[\alpha]_D$= -20.3° (CH_3OH,c=1.00,23.5°C).

No.1a — 100

$CDCl_3$ 300MHz
1.14-1.97(14H,m),2.19(1H,m),2.28(2H,t,J=7.4Hz),3.04(1H,m),3.69(3H,s),5.0 3(1H,d,J=6.9Hz),5.15-5.29(2H,m)7.65(2H,d,J=8.4Hz),7.87(1H,s),7.98(2H,d, J=8.4Hz).
IR($CHCl_3$):3386,3271,3025,3015,2955,2877,1755,1712,1608,1331,1162/cm.
$[\alpha]_D$= -29.4° (CH_3OH,c=1.01,25°C).

No.1a — 101

d_6-DMSO
1.00-2.20(17H,m),2.84(1H,m),5.00-5.20(2H,m),7.78(2H,d,J=8.2Hz),7.84(1H, s),7.89-7.95(3H,m).
IR(KBr):3269,3065,3008,2952,2874,2763,1746,1707,1607,1322,1157 /cm.
$[\alpha]_D$= -26.2° (CH_3OH,c=1.01,25°C).

No.1a — 102

CD_3OD
1.00-2.25(17H,m),2.92(1H,s),3.64(3H,s),5.07-5.21(2H,m),7.53(1H,s),7.77(2H, d,J=8.6Hz),7.90(2H,d,J=8.6).
IR(KBr):3430,3277,3006,2952,2873,1720,1687,1620,1571,1438,1312,1156 /cm.
$[\alpha]_D$= -27.3° (CH_3OH,c=0.51,26°C), mp 230-232°C.

No.1a — 103

$CDCl_3$ 300MHz
0.94-1.96(14H,m),2.19(1H,m),2.28(2H,t,J=7.2Hz),3.04(1H,m),3.69(3H,s),5.1 1(1H,d,J=6.6Hz),5.15-5.28(2H,m),7.60(2H,d,J=8.4Hz),7.67(1H,s),7.98(2H,d, J=8.4Hz).
IR($CHCl_3$):3381,3021,2955,2876,1735,1605,1437,1411,1325,1231,1177 /cm.
$[\alpha]_D$=+8.6° ($CHCl_3$,c=1.00,23°C).

No.1a — 104

$CDCl_3$ 300MHz
0.94-1.96(14H,m),2.21(1H,m),2.31(2H,t,J=6.8Hz),2.99(1H,m),5.18-5.28(2H, m),5.45(1H,d,J=6.6Hz),7.61(2H,d,J=8.7Hz),7.67(1H,s),7.99(2H,d,J=8.7Hz).
IR($CHCl_3$):3382,3222,3028,3019,2957,2876,1736,1709,1604,1412,1322,1301, 1286,1179,1162 /cm.
$[\alpha]_D$= +10.4° ($CHCl_3$,c=1.00,23°C).

No.1a — 105

$CDCl_3$ 300MHz
0.92-1.98(14H,m),2.17(1H,m),2.26(2H.d,J=7.5Hz),3.01(1H,m),3.69(3H,s),4.0 1(3H,s),4.84(1H,d,J=6.3Hz),5.14-5.30(2H,m),7.71(2H,d,J=8.7Hz),7.87(2H,d, J=8.7Hz),8.09(1H,s).
IR($CHCl_3$):3385,3284,3025,3015,2954,2877,2821,1730,1598,1459,1438,1403, 1341,1160,1052 /cm.
$[\alpha]_D$= +3.6° ($CHCl_3$,c=1.00,26°C).

No.1a — 106

$CDCl_3$ 300MHz
0.92-2.08(14H,m),2.14(1H,m),2.34(2H,d,J=7.2Hz),3.02(1H,m),4.01(3H,s),5.19(1H,d,J=6.9Hz),5.23-5.32(2H,m),7.71(2H,d,J=8.4Hz),7.88(2H,d,J=8.4Hz),8. 09(1H,s).
IR($CHCl_3$):3510,3384,3268,3028,3021,3014,2957,2877,2821,2667,2821,2666, 1707,1598,1459,1404,1341,1324,1160,1052 /cm.
$[\alpha]_D$= +11.8° ($CHCl_3$,c=1.01,25°C). mp 95-96°C

No.1a — 107

$CDCl_3$ 300MHz
0.92-1.97(14H,m),1.34(3H,t,J=7.2Hz),2.18(1H,m),2.28(2H.d,J=7.4Hz),3.01(1H,m),3.68(3H,s),4.26(2H,q,J=7.2Hz),4.86(1H,d,J=6.6Hz),5.15-5.29(2H,m),7.71(2H,d,J=8.7Hz),7.87(2H,d,J=8.7Hz),8.09(1H,s).
IR($CHCl_3$):3385,3282,3025,3026,3015,2954,2877,1729,1599,1480,1458,1438, 1403,1338,1161 /cm.
$[\alpha]_D$=+4.4° ($CHCl_3$,c=1.00,25°C).

No.1a — 108

$CDCl_3$ 300MHz
0.90-2.04(14H,m),1.34(3H,t,J=7.2Hz),2.14(1H,m),2.34(2H,d,J=7.1Hz),3.01(1H,m),4.27(2H,q,J=7.2Hz),5.20(1H,d,J=6.6Hz),5.21-5.35(2H,m),7.71(2H,d,J=8.4Hz),7.88(2H,d,J=8.4Hz),8.10(1H,s).
IR($CHCl_3$):3514,3384,3270,3025,3015,3015,2957,2877,1708,1599,1458,1403, 1324,1324,1160,1050 /cm.
$[\alpha]_D$= +12.7° ($CHCl_3$,c=1.00,25°C).

No.1a — 109

$[\alpha]_D$=+8.5° ($CHCl_3$,c=1.00,25°C).mp109.0-111.0°C

No.1a — 110

$CDCl_3$:CD_3OD(95:5)
0.92-2.06(14H,m),2.20(1H,m),2.30(2H,d,J=7.2Hz),2.99(1H,m),5.22-5.33(2H, m),7.54-7.66(3H,m),8.07(2H,d,J=9.0Hz),8.12-8.20(2H,m),8.29(2H,d,J=9.0Hz
IR(Nujol):3270,2956,2924,2854,1716,1548,1485,1319,1167/cm.
$[\alpha]_D$=+17.0° ($CHCl_3$,c=1.00,25°C). mp.166.5-168°C

No.1a — 111

$[\alpha]_D$=+2.6° ($CHCl_3$,c=1.00,24°C).mp120.0-121.0°C

No.1a — 112

$CDCl_3$ 300MHz
0.96-2.04(14H,m),2.19(1H,m),2.33(2H,d,J=7.1Hz),3.07(1H,m),5.28-5.31(2H, m),5.33(1H,d,J=6.6Hz),7.54-7.63(3H,m),8.05(2H,d,J=8.4Hz),8.18-8.23(2H,m),8.41(2H,d,J=8.4Hz).
IR($CHCl_3$):3384,3269,3025,3015,2957,2877,1708,1598,1496,1457,1417,1326, 1164 /cm.
$[\alpha]_D$= +12.2° ($CHCl_3$,c=1.00,24°C). mp.163-164°C

No.1a — 113

$[\alpha]_D$= +22.1° ($CHCl_3$,c=1.05,25°C). mp.90-92°C

No.1a — 114

$[\alpha]_D$= +2.2° ($CHCl_3$,c=1.02,25°C).

No.1a — 115

$CDCl_3$ 300MHz
0.90-1.98(14H,m),2.15-2.22(1H,m),2.27(2H,t,J=7.2Hz),2.95-3.04(1H,m),
3.68(3H,s),4.04(2H,s),4.85(1H,d,J=6.6Hz),5.10-5.27(2H,m),7.12-7.34(7H,m),7.76-7.82(2H,m).
IR($CHCl_3$):3384,3026,2952,1727,1595,1493,1436,1318,1155,1091,890/cm.
$[\alpha]_D$=0°
$[\alpha]_{436}$=+4.9±0.4 ° ($CHCl_3$,c=1.05,23°C)

No.1a — 116

$CDCl_3$ 300MHz
0.90-2.10(14H,m),2.10-2.18(1H,m),2.32(2H,t,J=7.2Hz),2.96-3.04(1H,m), 4.04(2H,s),5.14(1H,d,J=6.6Hz),5.16-5.28(2H,m),7.12-7.34(7H,m),7.76-7.82(2H,m).
IR($CHCl_3$):3260,3020,2950,1709,1407,1318,1154,1091,892/cm.
$[\alpha]_D$=+9.1±0.5 ° ($CHCl_3$,c=1.04,23°C)

No.1a — 117

CD_3OD 300MHz
0.96-2.18(17H,m),2.89-2.92(1H,m),4.05(2H,s),4.95-5.22(2H,m),7.15-7.42(7H,m),7.75-7.81(2H,m).
IR(KBr):3429,3279,2951,2872,1563,1494,1453,1408,1313,1155,1093,1057/cm.
$[\alpha]_D$=-16.3±0.5 ° (CH_3OH,c=1.06,25°C)

No.1a — 118

$CDCl_3$ 300MHz
0.98-1.70(15H,m),1.80-2.00(5H,m),2.20-2.40(3H,m),2.98(1H,m),4.06(2H,s),4. 72(1H,d,J=6.3Hz),5.00-5.23(3H,m),7.16(2H,d,J=8.4Hz),7.26-7.33(5H,m),7.7 9(2H,d,J=8.1Hz).
IR($CHCl_3$):3376,3020,2948,2868,1716,1596,1492,1453,1407,1318,1155,1105/cm.
$[\alpha]_D$=+2.4° ($CHCl_3$,c=1.08,24°C).

No.1a — 119

$CDCl_3$ 300MHz
0.90-2.02(14H,m),2.20(1H,m),2.29(2H,t,J=7.2Hz),3.00(1H,m),3.68(3H,s),4.8 6(1H,d,J=6.9Hz),5.13-5.34(2H,m),7.00-7.09(4H,m),7.22(1H,m),7.37-7.45(2H, m),7.79-7.86(2H,m).
IR($CHCl_3$):3376,3018,2946,2868,1727,1582,1486,1321,1243,1151,1093 /cm.
$[\alpha]_D$= +4.5° ($CHCl_3$,c=1.05,23.5°C).

No.1a — 120

CD_3OD 300MHz
1.00-2.00(14H,m),2.13(2H,t,J=7.5Hz),2.16(1H,m),2.91(1H,m),5.05-5.33(2H, m),7.04-7.11(4H,m),7.18-7.25(1H,m),7.38-7.48(2H,m),7.80-7.87(2H,m).
IR(KBr):3430,3278,3006,2952,2873,1583,1487,1410,1322,1298,1245,1152,1 095 /cm.
$[\alpha]_D$= -8.8° (CH_3OH,c=1.05,25.0°C).

No.1a — 121

$CDCl_3$ 300MHz
0.90-2.10(14H,m),2.15(1H,m),2.35(2H,t,J=7.2Hz),3.01(1H,m),5.20(1H,d,J=6. 9Hz),5.22-5.35(2H,m),7.00-7.09(4H,m),7.18-7.25(1H,m),7.37-7.45(2H,m),7.7 9-7.86(2H,m).
IR($CHCl_3$):3260,3020,2948,2868,1708,1582,1486,1409,1321,1296,1243,1151, 1093 /cm.
$[\alpha]_D$= +13.1° ($CHCl_3$,c=1.04,24.0°C).

No.1a — 122

$CDCl_3$ 300MHz
0.90-2.00(14H,m),2.23(1H,m),2.28(2H,t,J=7.5Hz),2.96(1H,m),3.67(3H,s),4.6 9(1H,d,J=6.6Hz),5.15-5.32(2H,m),6.22(1H,s),6.98-7.40(5H,m),7.30-7.38(2H, m),7.68-7.74(2H,m).
IR($CHCl_3$):3416,3370,3018,2946,2868,1725,1587,1508,1437,1400,1320,1149, 1094 /cm.
$[\alpha]_D$= +6.2° ($CHCl_3$,c=1.04,25.0°C).

No.1a — 123

$CDCl_3$ 300MHz
0.90-2.04(14H,m),2.18(1H,m),2.33(2H,t,J=7.2Hz),2.96(1H,m),5.04-5.35(3H, m),6.98-7.12(3H,m),7.12-7.20(2H,m),7.28-7.38(2H,m)7.66-7.74(2H,m).
IR($CHCl_3$):3424,3270,3028,2952,2872,1708,1587,1508,1445,1399,1320,1148, 1092 /cm.
$[\alpha]_D$= +20.9° ($CHCl_3$,c=1.06,23.0°C).

No.1a — 124

$CDCl_3$ 300MHz
0.90-2.00(14H,m),2.18(1H,m),2.28(2H,t,J=7.2Hz),3.00(1H,m),3.14(3H,s),3.6 8(3H,s),4.56(2H,s),4.84(1H,d,J=6.3Hz),5.10-5.29(2H,m),7.16-7.26(4H,m),7.2 6-7.34(2H,m),7.78-7.84(2H,m).
IR($CHCl_3$):3384,3028,2952,2874,1727,1598,1501,1435,1410,1370,1329,1172, 1148,1091 /cm.
$[\alpha]_D$= +2.7° ($CHCl_3$,c=1.09,23.0°C).

No.1a — 125

$CDCl_3$ 300MHz
0.90-2.00(14H,m),2.18(1H,m),2.28(2H,t,J=7.2Hz),2.29(3H,s)3.00(1H,m),3.6 8(3H,s),4.04(2H,s),4.80(1H,d,J=6.6Hz),5.11-5.29(2H,m),6.99-7.06(2H,m),7.1 2-7.19(2H,m),7.31(2H,d,J=8.1Hz),7.79(2H,d,J=8.1Hz).
IR($CHCl_3$):3382,3280,3024,2950,2874,1730,1596,1504,1435,1407,1367,1318 1196,1155,1091 /cm.
$[\alpha]_D$= +2.9° ($CHCl_3$,c=1.06,23.0°C).

No.1a — 126

$CDCl_3$ 300MHz
0.90-2.02(14H,m),2.14(1H,m),2.29(3H,s),2.32(2H,t,J=7.2Hz),3.01(1H,m),4.0 3(2H,s),5.10(1H,d,J=6.6Hz),5.15-5.30(2H,m)6.98-7.06(2H,m)7.11-7.18(2H, m),7.30(2H,d,J=8.1Hz),7.79(2H,d,J=8.1Hz).
IR($CHCl_3$):3374,3260,3020,2948,2868,1749,1708,1596,1504,1407,1369,1317, 1195,1155,1091 /cm.
$[\alpha]_D$= +10.0° ($CHCl_3$,c=1.09,23.0°C).

No.1a — 127

$CDCl_3$ 300MHz
0.87-1.95(14H,m),2.18-2.32(3H,m),2.95(1H,m),3.69(3H,s),3.96(2H,s),4.79(1 H,d,J=6.6Hz),4.97-5.17(2H,m),5.54(1H,s),6.75-6.82(2H,m),6.97-7.05(2H,m), 7.25-7.33(2H,m),7.75-7.81(2H,m).
IR($CHCl_3$):3382,3026,2950,2874,1722,1595,1511,1436,1407,1317,1257,1154, 1090 /cm.
$[\alpha]_D$= -2.1° ($CHCl_3$,c=1.00,21.5°C).

No.1a — 128

$CDCl_3$ 300MHz
0.85-2.02(14H,m),2.18(1H,m),2.31(2H,t,J=7.2Hz),2.96(1H,m),3.95(2H,s),5.0 5-5.27(3H,m),6.73-6.82(2H,m),6.96-7.04(2H,m),7.25-7.32(2H,m),7.74-7.81(2 H,m).
IR($CHCl_3$):3262,3020,2948,2868,1708,1596,1511,1407,1315,1242,1154,1091 /cm.
$[\alpha]_D$=+4.8° ($CHCl_3$,c=1.04,22°C).

No.1a — 129

$CDCl_3$ 300MHz
0.89-1.98(14H,m),2.18(1H,m),2.27(2H,t,J=7.2Hz),2.99(1H,m),3.68(3H,s),3.79(3H,s),3.98(2H,s),4.81(1H,d,J=6.6Hz),5.10-5.27(2H,m),6.81-6.87(2H,m),7.03-7.10(2H,m),7.25-7.32(2H,m),7.75-7.82(2H,m).
IR($CHCl_3$):3382,3276,3006,2950,2874,1726,1609,1509,1457,1436,1407,1315, 1244,1154,1091,1033/cm.
$[\alpha]_D$=+19.3° ($CHCl_3$,c=1.05,23°C).

No.1a — 130

$CDCl_3$ 300MHz
0.90-2.00(14H,m),2.20(1H,m),2.30(2H,t,J=7.2Hz),2.98(1H,m),3.69(3H,s),4.81(1H,d,J=6.6Hz),5.12-5.32(2H,m),5.46(1H,brs),6.84-7.01(6H,m),7.76-7.83(2 H,m)
IR($CHCl_3$):3380,3284,3024,2952,2874,1724,1588,1504,1488,1436,1321,1296, 1149,1091/cm.
$[\alpha]_D$=+28.9° ($CHCl_3$,c=1.01,23°C).

No.1a — 131

$CDCl_3$ 300MHz
0.92-2.10(14H,m),2.18(1H,m),2.34(2H,t,J=6.9Hz),2.96(1H,m),5.18-5.35(3H, m),6.84-7.01(6H,m),7.75-7.83(2H,m).
IR($CHCl_3$):3270,3028,2952,2874,1708,1589,1505,1489,1456,1322,1297,1238, 1148,1091/cm.
$[\alpha]_D$=+7.7° ($CHCl_3$,c=1.09,24°C).

No.1a — 132

$CDCl_3$ 300MHz
0.91-2.02(14H,m),2.19(1H,m),2.29(2H,t,J=7.2Hz),2.99(1H,m),3.68(3H,s),3.83(3H,s),4.82(1H,d,J=6.6Hz),5.14-5.33(2H,m),6.90-7.04(6H,m),7.76-7.83(2H, m).
IR($CHCl_3$):3384,3006,2952,2874,1727,1589,1502,1488,1459,1438,1321,1295, 1231,1150,1092,1033/cm.
$[\alpha]_D$=+3.1° ($CHCl_3$,c=1.01,23°C).

No.1a — 133

TLC Rf=0.21 (ethyl acetate/n-hexane = 1:1 (0.3% acetic acid))

No.1a — 134

$CDCl_3$ 300MHz
0.97-2.10(14H,m),2.20(1H,m),2.36(2H,t,J=6.9Hz),3.04(1H,m),5.22-5.33(2H, m),5.41(1H,d,J=6.6Hz),7.02(1H,d,J=9.0Hz),7.09-7.13(2H,m),7.26-7.32(1H,m),7.43-7.49(2H,m),7.93(1H,d.d,J=2.4and9.0Hz),8.46(1H,d,J=2.4Hz).
IR($CHCl_3$):3384,3270,3020,2958,1709,1610,1587,1537,1479,1352,1271,1252, 1167/cm.
$[\alpha]_D$=+20.9° ($CHCl_3$,c=0.51,22°C).

No.1a — 135

$CDCl_3$ 300MHz
0.96-2.02(14H,m),2.21(1H,m),2.29(2H,t,J=7.2Hz),3.07(1H,m),3.68(3H,s),5.04(1H,d,J=6.9Hz),5.16-5.33(2H,m),7.48-7.55(2H,m),7.64(1H,m),7.76-7.82(2H, m),7.88-7.94(2H,m),7.98-8.04(2H,m).
IR($CHCl_3$):3384,3282,3026,2952,2874,1727,1663,1596,1446,1396,1316,1274, 1163,1090 /cm.
$[\alpha]_D$= +3.1° ($CHCl_3$,c=1.03,22.0°C).

No.1a — 136

$CDCl_3$ 300MHz
0.95-2.05(14H,m),2.19(1H,m),2.34(2H,t,J=7.2Hz),3.08(1H,m),5.10-5.40(2H, m),5.35(1H,d,J=6.8Hz),7.45-

7.58(2H,m),7.64(1H,m),7.74-7.84(2H,m),7.84-7. 95(2H,m),7.95-8.06(2H,m).
IR($CHCl_3$):3260,3018,2950,2870,1708,1662,1595,1446,1395,1316,1274,1162, 1090 /cm.
$[\alpha]_D$= +12.9° ($CHCl_3$,c=1.05,21.5°C).

No.1a — 137

$CDCl_3$ 300MHz
0.97-2.04(14H,m),2.27(1H,m),2.31(2H,t,J=7.2Hz),3.07(1H,m),3.70(3H,s),5.1 5-5.30(3H,m),7.48-7.68(5H,m),7.96-8.02(2H,m).
IR($CHCl_3$):3382,3030,2952,2878,1725,1446,1329,1154,1098 /cm.
$[\alpha]_D$= -12.1° ($CHCl_3$,c=1.03,22.0°C).

No.1a — 138

$CDCl_3$ 300MHz
0.95-2.04(14H,m),2.25(1H,m),2.35(2H,t,J=7.2Hz),3.08(1H,m),5.15-5.34(2H, m),5.41(1H,d,J=6.6Hz),7.48-7.68(5H,m),7.98-8.03(2H,m).
IR($CHCl_3$):3370,3242,3022,2950,2870,1707,1445,1408,1329,1154,1099 /cm.
$[\alpha]_D$=-0.6° ($CHCl_3$,c=1.06,21.5°C) $[\alpha]_{365}$= +30.7° ($CHCl_3$,c=1.06,21.5°C).

No.1a — 139

$CDCl_3$ 300MHz
0.92-2.19(14H,m),2.27-2.34(3H,m),3.26(1H,m),3.65(3H,s),4.28(2H,s),4.37(1 H,d,J=7.4Hz),5.34-5.50(2H,m),7.37-7.62(9H,m).
IR($CHCl_3$):3389,3294,3028,3015,2954,2877,1730,1600,1488,1325,1151,1129 /cm.
$[\alpha]_D$= -24.8° ($CHCl_3$,c=1.01,24°C).

No.1a — 140

$CDCl_3$ 300MHz
0.92-2.22(15H,m),2.34(2H,t,J=7.1Hz),3.24(1H,m),4.29(2H,s),4.81(1H,d,J=7. 4Hz),5.32-5.52(2H,m),7.36-7.62(9H,m).
IR($CHCl_3$):3510,3388,3251,3031,3015,2956,2877,2668,1708,1601,1488,1318, 1151,1129 /cm.
$[\alpha]_D$= -24.6° ($CHCl_3$,c=1.02,25°C).

No.1a — 141

$CDCl_3$ 300MHz
0.92-2.19(15H,m),2.32(2H,t,J=7.2Hz),3.26(1H,m),3.65(3H,s),4.31(2H,s)4.48 (1H,d,J=7.4Hz),5.33-5.49(2H,m),7.42-7.80(8H,m).
IR($CHCl_3$):3388,3285,3018,2955,2877,2225,1730,1597,1479,1320,1152,1129 /cm.
$[\alpha]_D$= -20.1° ($CHCl_3$,c=0.96,25°C).

No.1a — 142

$CDCl_3$ 300MHz
0.92-2.22(15H,m),2.35(2H,t,J=6.8Hz),3.25(1H,m),4.32(2H,s),4.86(1H,d,J=7. 4Hz),5.33-5.53(2H,m),7.43-7.80(8H,m).
IR($CHCl_3$):3512,3388,3258,3031,3023,3014,2956,2877,2225,1708,1597,147 9,1319,1151,1128 /cm.
$[\alpha]_D$= -19.3° ($CHCl_3$,c=1.09,23°C).

No.1a — 143

$CDCl_3$ 300MHz
1.00-1.93(14H,m),2.17(1H,m),2.27(2H,t,J=7.2Hz),3.07(1H,m),5.17-5.22(2H, m),5.36(1H,d,J=6.9Hz),7.77(1H,d,J=9.0Hz),8.11-8.17(2H,m)8.36(1H,d.d,J= 2.1and9.0Hz),8.51(1H,d,J=1.8Hz),8.65(1H,d,J=2.1Hz).

IR($CHCl_3$):3382,3266,3026,2954,2874,1708,1632,1585,1528,1458,1419,1345, 1153/cm.
$[\alpha]_D$=+7.6° ($CHCl_3$,c=1.04,22°C).

No.1a — 144

$CDCl_3$ 300MHz
0.95-1.90(14H,m),2.17(1H,m),2.25(2H,t,J=7.5Hz),3.02(1H,m),5.09(1H,d,J=6. 6Hz),5.15-5.21(2H,m),6.72(1H,d,J=8.4Hz),6.85(1H,s),7.54(1H,d,J=8.4Hz),7.72(1H,d,J=9.0Hz),7.83(1H,d.d,J=1.8and9.0Hz),8.32(1H,d,J=1.8Hz).
IR($CHCl_3$):3380,3260,3022,2948,2868,2352,1709,1636,1460,1425,1313,1291, 1265,1148,1130/cm.
$[\alpha]_D$=+12.9° ($CHCl_3$,c=1.02,22.5°C).

No.1a — 145

$CDCl_3$ 300MHz
0.97-1.90(14H,m),2.15(1H,m),2.27(2H,t,J=6.9Hz),3.02(1H,m),3.08(6H,s),5.12(1H,d,J=6.3Hz),5.19-5.25(2H,m),6.78-6.84(2H,m),7.53(1H,d,J=8.7Hz),7.76-7.83(2H,m),8.30(1H,d,J=1.8Hz).
IR($CHCl_3$):3272,3030,2950,2874,1708,1635,1601,1511,1457,1425,1357,1328, 1151,1124/cm.
$[\alpha]_D$=+6.3° ($CHCl_3$,c=1.04,23°C).

No.1a — 146

$CDCl_3$ 300MHz
0.95-2.00(14H,m),2.16(1H,m),2.29(2H,t,J=7.2Hz),3.05(1H,m),4.10(3H,s),5.13-5.28(2H,m),5.38(1H,d,J=6.9Hz),7.67-7.74(2H,m),8.08(1H,d.d,J=1.8and9.0 Hz),8.11(1H,s),8.61(1H,d,J=1.8Hz).
IR($CHCl_3$):3260,3020,2948,2868,1708,1639,1606,1528,1470,1455,1424,1349,
1311,1238,1174,1149,1120,1079,1060,1022/cm.
$[\alpha]_D$=+7.8° ($CHCl_3$,c=1.00,23°C).

No.1a — 147

$CDCl_3$ 300MHz
0.92-1.92(14H,m),2.17(1H,m),2.25(2H,t,J=7.2Hz),3.01(1H,m),3.97(3H,s),5.10-5.27(5H,m),6.92(1H,s),7.29(1H,s),7.52(1H,d,J=8.7Hz),7.82(1H,d.d,J=2.1a nd8.7Hz),8.33(1H,d,J=2.1Hz).
IR($CHCl_3$):3380,3264,3002,2950,2868,1708,1634,1476,1452,1426,1317,1264,
1218,1169,1147,1115,1068,1031/cm.
$[\alpha]_D$=+5.6° ($CHCl_3$,c=1.02,23°C).

No.1a — 148

$CDCl_3$ 300MHz
0.90-1.98(14H,m),2.15(1H,m),2.28(2H,t,J=6.9Hz),2.91(6Hs),3.03(1H,m),4.01(3H,s),5.15-5.26(3H,m),7.18(1H,s),7.38(1H,s),7.59(1H,d,J=8.7Hz),7.87(1H,d. d,J=2.1and8.7Hz),8.40(1H,d,J=2.1Hz).
IR($CHCl_3$):3384,3266,2956,1709,1632,1602,1495,1473,1458,1430,1317,1231, 1148,1121/cm.
$[\alpha]_D$=+11.2° ($CHCl_3$,c=1.01,23°C).

No.1a — 149

$CDCl_3$ 300MHz
0.99-1.90(14H,m),2.17(1H,m),2.28(2H,t,J=7.2Hz),3.00(1H,m),5.13-5.19(2H,m),5.43(1H,d,J=6.0Hz),7.02(1H,d.d,J=2.4and9.0Hz),7.38-7.41(2H,m),7.58(1H,d,J=8.7Hz),7.96(1H,d.d,J=1.8and8.7Hz),8.45(1H,d,J=1.8Hz).
IR($CHCl_3$):3270,3020,2948,2868,1709,1601,1478,1448,1419,1315,1147,1120/cm.
$[\alpha]_D$=-11.4° ($CHCl_3$,c=1.01,23°C).

No.1a — 150

$CDCl_3$ 300MHz

0.97-1.88(14H,m),2.12-2.31(3H,m),2.38(3H,s),3.01(1H,m),5.14-5.19(2H,m),5.
36(1H,d,J=6.6Hz),7.24(1H,d.d,J=2.4and9.0Hz),7.59(1H,d,J=6.3Hz),7.66(1H,
d,J=8.7Hz),7.72(1H,d,J=2.4Hz),8.01(1H,d.d,J=1.8and8.7Hz),8.49(1H,d,J=1. 8Hz).
IR($CHCl_3$):3470,3374,3260,3018,2950,2868,1709,1474,1444,1412,1370,1319, 1266,1162,1145,1118/cm.
$[\alpha]_D$=+4.9° ($CHCl_3$,c=1.00,24°C).

No.1a — 151

$CDCl_3$ 300MHz
0.97-1.89(14H,m),2.17(1H,m),2.25(2H,t,J=7.2Hz),3.03(1H,m),3.92(3H,s),5.1 5-
5.20(2H,m),5.32(1H,d,J=6.6Hz),7.11(1H,d.d,J=2.4and9.3Hz),7.45(1H,d,J=
2.4Hz),7.50(1H,d,J=9.3Hz),7.62(1H,d,J=8.7H),7.97(1H,d.d,J=2.1and8.7Hz), 8.50(1H,d,J=2.1Hz).
IR($CHCl_3$):3260,3018,2948,1708,1483,1454,1432,1314,1287,1268,1188,1169, 1147/cm.
$[\alpha]_D$=+4.9° ($CHCl_3$,c=1.01,23.5°C).

No.1a — 152

$CDCl_3$ 300MHz
0.98-2.04(14H,m),2.15(1H,m),2.30(2H,t,J=6.6Hz),3.04(1H,m),5.17-5.29(3H,
m),7.41(1H,d.d,J=1.5and8.1Hz),7.64-7.68(2H,m),7.92(1H,d,J=8.4Hz),8.00(1
H,d.d,J=1.8and8.4Hz),8.49(1H,d,J=1.8Hz).
IR($CHCl_3$):3266,3028,2952,2872,1707,1629,1591,1456,1416,1318,1275,1150/cm.
$[\alpha]_D$=+3.2° ($CHCl_3$,c=1.04,23°C).

No.1a — 153

$CDCl_3$ 300MHz
0.97-1.88(14H,m),2.16(1H,m),2.26(2H,t,J=7.2Hz),3.03(1H,m),4.64-4.65(2H, m),5.16-
5.50(5H,m),6.13(1H,m),7.14(1H,d.d,J=2.7and9.0Hz),7.46-7.52(2H,
m),7.63(1H,d,J=8.7Hz),7.97(1H,d.d,J=1.8and8.7Hz),8.49(1H,d,J=1.8Hz).
IR($CHCl_3$):3374,3260,3020,2948,2868,1708,1599,1478,1446,1414,1314,1284, 1268,1184,1148,1120/cm.
$[\alpha]_D$=+5.3° ($CHCl_3$,c=1.00,23°C).

No.1a — 154

$CDCl_3$ 300MHz
0.99-2.00(15H,m),2.26(2H,t,J=7.2Hz),3.03(1H,m),4.07(3H,s),5.23-5.27(2H,m
),5.36(1H,d,J=7.2Hz),7.20(1H,s),7.36-7.48(2H,m),7.55-7.58(1H,m),7.91-7.93 (1H,m),8.52(1H,s).
IR($CHCl_3$):3362,3257,3020,2948,2868,1708,1637,1602,1579,1488,1457,1437,
1413,1345,1318,1301,1276,1182,1104/cm.
$[\alpha]_D$= +19.4° ($CHCl_3$,c=1.01,25°C).
mp.88-90°C

No.1a — 155

$CDCl_3$ 300MHz
0.92-2.02(14H,m),2.15(1H,m),2.31(2H,t,J=7.2Hz),3.01(1H,m),4.10(2H,s),5.1 0(1H,d,J=6.6Hz),5.18-
5.35(2H,m),7.04-7.26(5H,m),7.67-7.76(2H,m).
IR($CHCl_3$):3266,3028,2952,2952,2872,1708,1599,1574,1478,1457,1418,1301, 1258,1147,1124,1101,1080/cm.
$[\alpha]_{365}$ +33.4° ($CHCl_3$,c=1.00,23°C).

No.1a — 156

$CDCl_3$ 300MHz
0.91-2.21(15H,m),2.33(2H,t,J=6.9Hz),3.01(1H,m)5.11(1H,d,J=6.6Hz),5.27-5. 35(2H,m),6.85-
6.96(5H,m),7.35(1H,d,J=2.1Hz),7.42(1H,d.d,J=2.1and8.7Hz).
IR($CHCl_3$):3384,3263,2957,1708,1587,1489,1462,1416,1290,1222,1151,1123/cm.
$[\alpha]_D$=+6.4° ($CHCl_3$,c=1.00,23°C).

No.1a — 157

$CDCl_3$ 300MHz
0.97-1.91(14H,m),2.18(1H,m),2.26(2H,t,J=6.9Hz),3.04(1H,m),5.18-5.26(3H, m),7.52-7.56(2H,m),7.88-8.00(3H,m),8.25(1H,m),8.69(1H,m).
IR($CHCl_3$):3382,3268,2952,2874,1707,1457,1425,1409,1318,1152/cm.
$[\alpha]_D$=+4.4° ($CHCl_3$,c=1.02,22°C).

No.1a — 158

$CDCl_3$ 300MHz
1.02-1.97(14H,m),2.20(1H,m),2.29(2H,t,J=7.2Hz),3.06(1H,m),5.19-5.24(2H, m),5.58(1H,d,J=6.6Hz),7.62(1H,m),7.72(1H,m),7.86-7.91(2H,m),7.96(1H,d,J =7.8Hz),8.04(1H,d.d,J=1.5and8.1Hz),8.34(1H,d,J=1.2Hz).
IR($CHCl_3$):3490,3260,3020,2950,2870,1707,1456,1399,1312,1165/cm.
$[\alpha]_D$=-8.3° ($CHCl_3$,c=1.00,23°C).

No.1a — 159

$CDCl_3$ 300MHz
0.92-1.88(14H,m),2.13(1H,m),2.24(2H,m),3.02(1H,m),3.90(3H,s),5.12-5.26(3H,m),7.29-7.58(4H,m),7.97(1H,d.d,J=1.8and7.5Hz),8.13(1H,d,J=7.5Hz),8.64 (1H,d,J=1.8Hz).
IR($CHCl_3$):3382,3266,3018,2956,1708,1629,1594,1476,1467,1325,1245,1227, 1158,1146/cm.
$[\alpha]_D$=+14.6° ($CHCl_3$,c=1.00,22°C).

No.1a — 160

$CDCl_3$ 300MHz
0.93-1.88(14H,m),2.18-2.24(3H,m),3.00(1H,m),5.08-5.21(3H,m),7.28-7.33(1H,m),7.47-7.51(3H,m),7.90(1H,d.d,J=1.5and7.8Hz),8.10(1H,d,J=7.8Hz),8.63 -8.64(2H,m).
IR($CHCl_3$):3465,3380,3275,3020,2957,2876,1708,1627,1604,1495,1473,1457, 1328,1240,1222,1156,1149/cm.
$[\alpha]_D$=+8.2° ($CHCl_3$,c=1.01,22°C).

No.1a — 161

$CDCl_3$ 300MHz
0.98-1.88(14H,m),2.17(1H,m),2.24(2H,t,J=7.2Hz),3.05(1H,m),5.16-5.20(2H, m),5.35(1H,d,J=6.6Hz),7.40(1H,m),7.55(1H,m),7.63(1H,d,J=8.1Hz),7.89(1H, d.d,J=1.5and8.1Hz),8.01(1H,m),8.06(1H,d,J=8.1Hz),8.12(1H,d,J=1.5Hz).
IR($CHCl_3$):3478,3266,3028,2952,2874,1708,1454,1417,1323,1196,1148/cm.
$[\alpha]_D$=+21.9° ($CHCl_3$,c=1.01,23°C).

No.1a — 162

$CDCl_3$ 300MHz
0.96-1.98(14H,m),2.02(1H,m),2.25(2H,t,J=7.2Hz),3.05(1H,m),4.10(3H,s),5.14-5.25(2H,m),5.41(1H,d,J=7.2Hz),7.35-7.42(1H,m),7.51-7.64(3H,m),7.94-8.0 0(1H,m),8.16(1H,s).
IR($CHCl_3$):3368,3274,3028,2952,2874,1708,1633,1583,1465,1452,1438,1413, 1315,1151,1103,1053,1024/cm.
$[\alpha]_D$= +15.1° ($CHCl_3$,c=1.01,23°C). mp.108-110°C

No.1a — 163

d_6-DMSO 300MHz
0.97-1.84(14H,m),1.92(1H,m),2.04(2H,t,J=7.5Hz),2.90(1H,m),5.08-5.23(2H, m),7.32(1H,s),7.38-7.61(2H,m),7.62(1H,s)7.68-7.71(1H,m),7.92(1H,s),8.14-8. 17(1H,m),10.7(1H,s),11.9(1H,s).
IR(KBr):3350,3295,2952,2874,1707,1636,1601,1466,1431,1389,1315,1251,1 174,1146,1106/cm.
$[\alpha]_D$= -25.3° (CH_3OH,c=1.01,25°C). mp.159-162°C

No.1a — 164

$CDCl_3$ 300MHz
0.98-1.96(17H,m),2.05(1H,m),2.25(2H,t,J=7.2Hz)3.07(1H,m)4.32(2H,q,J=7. 2Hz),5.19-5.23(2H,m),5.31(1H,d,J=7.8Hz),7.38(1H,m)7.41-7.62(3H,m),7.95(1H,m),8.15(1H,s).
IR($CHCl_3$):3360,3018,2946,2870,1709,1633,1457,1445,1425,1394,1314,1176, 1152,1105/cm.
$[\alpha]_D$= +12.7° ($CHCl_3$,c=1.02,25°C). mp.108-109°C

No.1a — 165

$CDCl_3$ 300MHz
0.95-1.98(15H,m),2.26(2H,t,J=7.5Hz),3.04(1H,m),4.15(3H,s)5.20-5.26(2H,m),5.34(1H,d,J=6.9Hz),7.41-7.47(1H,m),7.65-7.68(2H,m)7.89-7.92(1H,m),8.3 2(1H,s).
IR($CHCl_3$):3366,3087,3022,2957,1708,1632,1538,1463,1408,1364,1346,1308, 1227,1212,1205,1167/cm.
$[\alpha]_D$= +19.6° ($CHCl_3$,c=1.01,25°C).

No.1a — 166

$CDCl_3$ 300MHz
0.97-2.02(15H,m),2.27(2H,t,J=6.9Hz),3.07(1H,m),4.14(3H,s)5.21-5.27(2H,m),5.47(1H,d,J=6.9Hz),7.64(1H,s),7.72(1H,d.d,J=0.6and9.0Hz)8.25(1H,s)8.4 7(1H,d.d,J=2.4and9.0Hz),8.94(1H,d.d,J=0.6and2.4Hz).
IR($CHCl_3$):3373,2957,1708,1639,1587,1528,1467,1428,1415,1345,1221,1184, 1155/cm.
$[\alpha]_D$= +14.4° ($CHCl_3$,c=0.50,25°C)

No.1a — 167

$CDCl_3$ 300MHz
0.92-2.00(14H,m),2.15(1H,m),2.27(2H,t,J=7.2Hz),3.04(1H,m),3.97(2H,s),5.1 5-5.30(3H,m),7.35-7.47(2H,m),7.55-7.63(1H,m),7.80-7.96(3H,m),8.05(1H,d,J =0.3Hz).
IR($CHCl_3$):3260,3020,2948,2868,1707,1451,1413,1319,1172,1144,1101,1071/cm.
$[\alpha]_D$=+18.2° ($CHCl_3$,c=1.04,22°C).

No.1a — 168

$CDCl_3$ 300MHz
0.90-1.88(14H,m),2.16(1H,m),2.25(2H,t,J=6.9Hz),3.00(1H,m),5.00-5.19(2H, m),5.35(1H,d,J=6.6Hz),7.25-7.30(1H,m),7.48-7.50(2H,m),7.73(1H,d.d,J=1.5 and8.1Hz),8.08-8.14(3H,m),8.93(1H,s).
IR($CHCl_3$):3466,3380,3276,3016,2957,1708,1630,1495,1458,1324,1241,1150/cm.
$[\alpha]_D$=+18.0° ($CHCl_3$,c=1.00,22°C).

No.1a — 169

$CDCl_3$ 300MHz
0.87-1.86(14H,m),2.15(1H,m),2.25(2H,t,J=6.9Hz),2.98(1H,m),3.89(3H,s),5.0 0-5.22(2H,m),5.27(1H,d,J=6.9Hz),6.88(1H,d.d,J=2.1and8.4Hz),6.94(1H,d,J= 2.1Hz),7.69(1H,d.d,J=1.5and7.8Hz),7.92-8.01(3H,m),8.83(1H,s).
IR($CHCl_3$):3465,3378,3276,3022,2957,1708,1630,1609,1569,1459,1433,1314, 1281,1229,1151/cm.
$[\alpha]_D$=+19.3° ($CHCl_3$,c=1.01,21°C).

No.1a — 170

$CDCl_3$ 300MHz
0.88-2.25(17H,m),3.04(1H,m),3.84(3H,s),3.95(3H,s),5.06-5.26(3H,m),6.87-6. 93(2H,m),7.69(1H,d.d,J=1.6and8.2Hz),7.93-9.05(3H,m).
IR($CHCl_3$):3026,2957,1708,1630,1601,1460,1331,1243,1224,1152/cm.
$[\alpha]_D$=+17.2° ($CHCl_3$,c=1.00,22°C).

No.1a — 171

$CDCl_3$ 300MHz
0.95-2.00(14H,m),2.16-2.32(3H,m),2.66(3H,s),3.14(1H,m),3.68(3H,s),5.09(1H,d,J=6.8Hz),5.10-5.28(2H,m),7.45(1H,d.d.,J=1.8&8.6Hz),7.75-7.84(2H,m).
IR($CHCl_3$):3374,3018,2946,2868,1725,1585,1513,1436,1340,1278,1153,1112 /cm.
$[\alpha]_D$= -14.7° ($CHCl_3$,c=1.07,25.0°C).

No.1a — 172

$CDCl_3$ 300MHz
0.97-2.02(14H,m),2.23(1H,m),2.28(2H,t,J=7.2Hz),2.66(3H,s),3.14(1H,m),5.12-5.22(2H,m),5.41(1H,d,J=7.2Hz),7.45(1H,d.d.,J=2.1&8.7Hz),7.76(1H,d,J=8. 7Hz),7.78(1H,d,J=2.1Hz).
IR($CHCl_3$):3372,3250,3022,2950,2868,1707,1514,1419,1336,1279,1154,1112 /cm.
$[\alpha]_D$= -4.1° ($CHCl_3$,c=1.08,26.0°C) m.p.141-143°C

No.1a — 173

$CDCl_3$ 300MHz
1.15-2.42(17H,m),2.91(1H,m),5.15(1H,d,J=4.2Hz),5.25-5.40(2H,m),7.85(1H, t,J=7.2Hz),8.00(1H,t,J=8.1Hz),8.15-8.20(2H,m),8.67(1H,d,J=8.1Hz),8.73(1H, d,J=8.1Hz),8.83(1H,s),9.43(1H,s).
IR(KBr):3422,3269,3046,2952,2871,1711,1617,1447,1333,1243,1161,1146/cm.
$[\alpha]_D$=-41.0° (CH_3OH,c=1.01,23°C).

No.1a — 174

$CDCl_3$+d_6-DMSO 300MHz
1.00-1.92(14H,m),2.20(2H,t,J=6.6Hz),2.35(1H,m),2.92(1H,m),5.05-5.22(2H, m),6.63(1H,d,J=5.4Hz),7.77-7.92(3H,m),8.31(1H,d.d,J=1.8and8.7Hz),8.59(1H,d,J=8.7Hz),8.73(1H,d,J=8.7Hz),9.01(1H,s),9.55(1H,d,J=1.8Hz).
IR(KBr):3433,3252,2952,2871,1696,1578,1423,1335,1308,1219,1185,1160,1 106/cm.
$[\alpha]_D$=-19.3° (DMSO,c=0.50,23°C).

No.1a — 175

$CDCl_3$ 300MHz
0.96-1.87(14H,m),2.20-2.25(3H,m),2.95(1H,m),3.66(3H,s),4.74(1H,d,J=6.6Hz),5.10-5.12(2H,m),6.88(1H,d,J=1.2Hz),7.37-7.50(3H,m),7.56(1H,dd,J=8.7,1.5Hz),7.68-7.77(3H,m),8.06(1H,s),9.44(1H,dd,J=1.2Hz).
IR($CHCl_3$):3462,3374,3026,3006,2952,2872,1724,1610,1580,1484,1452,1358, 1309,1147.
$[\alpha]_D$=+16.4° ($CHCl_3$,c=1.05,26°C). mp.130-132°C.

No.1a — 176

$CDCl_3$+CD_3OD 300MHz
1.00-2.02(14H,m)2.22(1H,m),2.29(2H,t,J=6.9Hz),2.88(1H,m),5.16-5.26(2H, m),6.87(1H,s),7.28-7.57(4H,m),7.69(1H,d,J=8.4Hz),7.75-7.78(2H,m),7.99(1H, s).
IR(KBr):3254,2944,1704,1484,1453,1358,1305,1147.
$[\alpha]_D$=+13.0° (CH_3OH,c=1.02,24°C), mp.160-161°C

No.1a — 177

$CDCl_3$ 300MHz
0.96-1.88(14H,m),1.88-2.26(3H,m),2.94(1H,m),3.67(3H,s),3.87(3H,s),4.67(1H,brs),5.08-5.14(2H,m),6.77(1H,d,J=1.5Hz),6.99-7.02(2H,m),7.53-7.57(1H, m),7.65-7.70(3H,m),8.00(1H,s),9.27(1H,brs).
IR($CHCl_3$):3426,3376,3006,2952,1724,1610,1495,1438,1357,1308,1282,1249, 1177,1147/cm.
$[\alpha]_D$=+18.1° ($CHCl_3$,c=1.02,22°C).

No.1a — 178

$CDCl_3$+CD_3OD 300MHz
0.96-1.91(14H,m),2.19(1H,m),2.27(2H,t,J=6.0Hz),2.85(1H,m),3.87(3H,s),5.1 6-5.23(2H,m),6.99-7.02(2H,m),7.41(1H,m),7.64-7.73(3H,m),7.92(1H,m).
IR($CHCl_3$):3366,3261,3004,2954,2873,1705,1611,1496,1458,1438,1304,1286, 1253,1180,1149,1128/cm.
$[\alpha]_D$=+14.6° ($CHCl_3$,c=1.02,22°C).

No.1a — 179

$CDCl_3$+CD_3OD 300MHz
0.96-1.87(14H,m),2.15-2.23(3H,m),2.93(1H,m),3.85(3H,s),5.10-5.16(2H,m),6. 90-6.93(2H,m),7.50(1H,m),7.60-7.65(3H,m),7.91(1H,d,J=0.9Hz).
IR($CHCl_3$):3369,3270,2950,2873,1719,1612,1498,1456,1440,1359,1306,1269, 1219,1146,1127/cm.
$[\alpha]_D$=+18.1° (CH_3OH,c=1.00,22°C).

No.1a — 180

$CDCl_3$+CD_3OD 300MHz
1.03-1.86(14H,m),2.08-2.17(3H,m),2.91(1H,m),5.06-5.10(2H,m),6.76(1H,m), 6.86-6.90(2H,m),7.48(1H,m),7.61-7.69(3H,m),7.89(1H,m).
IR($CHCl_3$):3360,3259,2954,2873,1706,1612,1497,1457,1360,1306,1272,1230, 1176,1148,1126/cm.
$[\alpha]_D$=+20.3° (CH_3OH,c=1.00,22°C).

No.1a — 181

$CDCl_3$ 300MHz
0.97-1.96(14H,m),2.15(1H,m),2.29(2H,t,J=6.9Hz),3.05(1H,m),3.81(3H,s)5.0 8(1H,d,J=6.9Hz),5.23-5.25(2H,m),6.62(1H,s),7.47-7.54(5H,m),7.59(1H,m),7. 70(1H,m),7.97(1H,m).
IR($CHCl_3$):3380,3260,3020,2946,2868,1708,1466,1388,1328,1149/cm.
$[\alpha]_D$=+32.9° ($CHCl_3$,c=1.07,22°C).

No.1a — 182

$CDCl_3$ 300MHz
0.94-1.90(14H,m),2.25(2H,t,J=7.5Hz)2.30(1H,m),2.98(1H,m),3.70(3H,s)4.8 3(1H,d,J=6.6Hz),5.13-5.16(2H,m),6.95(1H,d,J=1.5Hz),7.11-7.23(2H,m),7.43(1H,d,J=8.1Hz),7.65(1H,d,J=8.1Hz),7.79-7.93(4H,m),9.08(1H,br).
IR($CHCl_3$):3458,3372,3020,3002,2946,2868,1719,1598,1452,1422,1321,1300, 1157/cm.
$[\alpha]_D$=-6.6° ($CHCl_3$,c=1.00), mp 150-151°C

No.1a — 183

$CDCl_3$ 300MHz
0.95-1.94(14H,m),2.26(1H,m),2.28(2H,t,J=7.5Hz),3.00(1H,m),5.16-5.19(2H, m),5.32(1H,d,J=7.2Hz),6.93(1H,d,J=1.2Hz),7.13(1H,m),7.22(1H,dd,J=7.8,6. 6Hz),7.42(1H,d,J=7.8Hz),7.63(1H,d,J=7.8Hz),7.76(2H,d,J=8.4Hz),7.90(2H,d, J=8.4Hz),8.95(1H,br).
IR($CHCl_3$):3458,3374,3260,3020,3002,2948,2868,1708,1598,1452,1422,130 1,1156/cm.
$[\alpha]_D$=+17.9° ($CHCl_3$,c=1.01,22°C).

No.1a — 184

$CDCl_3$ 200MHz
0.92-2.00(14H,m),2.20(1H,m),2.34(2H,t,J=6.8Hz),3.05(1H,m),5.20-5.36(3H, m),7.39-7.44(2H,m),7.61-7.66(1H,m),7.80-7.84(1H,m),8.05(2H,d,J=8.6Hz),8. 40(2H,d,J=8.6Hz).
IR($CHCl_3$):3384,3271,3019,2958,1709,1615,1599,1551,1453,1405,1344,1326, 1243,1163/cm.
$[\alpha]_D$=+18.5° ($CHCl_3$,c=1.00,21°C).

No.1a — 185

$CDCl_3$ 300MHz
0.89-2.20(15H,m),2.26(2H,d.t,J=2.1and7.2Hz),2.99(1H,m),5.08(1H,d,J=6.3H z),5.09-5.24(2H,m),6.90(1H,d,J=1.2Hz),7.32-7.48(4H,m),7.64-7.72(3H,m),8. 20(1H,d,J=1.2Hz),9.00(1H,s).
IR($CHCl_3$):3464,3375,3275,3022,2956,1707,1605,1490,1449,1356,1322,1219, 1147,1131/cm.
$[\alpha]_D$=+21.6° ($CHCl_3$,c=1.01,23°C).

No.1a — 186

$CDCl_3$:300MHz
1.36-2.24(14H,m),2.31(2H,t,J=7.4Hz),2.49(1H,brs),3.37(1H,m),3.67(3H,s),5. 38-5.50(2H,m),7.40-7.68(9H,m).
IR($CHCl_3$):3375,1727,1602,1435,1362,1221,1207,1168,1045/cm.

No.1a — 187

$CDCl_3$:300MHz
1.10-2.25(14H,m),2.36(2H,t,J=7.2Hz),2.47(1H,m),3.37(1H,m),5.35-5.54(2H, m),5.62(1H,d,J=7.2Hz),7.39-7.70(9H,m).
IR($CHCl_3$):3674,3496,3376,3234,3012,2952,2880,2650,1725(sh),1709,1602,1 485,1420,1360,1167/cm.
$[\alpha]_D$=+32° ($CHCl_3$,c=1.69).

No.1a — 188

$CDCl_3$ 200MHz
0.86-1.92(14H,m),2.22(3H,m),2.36(3H,s),2.95(1H,m),3.67(3H,s),3.93(3H,s),4. 81(1H,d,J=6.2Hz),5.04-5.20(2H,m),7.02-7.05(2H,m),7.31(1H,d,J=8.6Hz),7.3 9(1H,d,J=7.8Hz),7.79-7.89(3H,m).
IR($CHCl_3$):3385,3286,3029,3019,3015,2954,2877,1718,1617,1598,1567,1507, 1311,1269,1153 /cm.
$[\alpha]_D$= -29.4° ($CHCl_3$,c=1.01,25°C).

No.1a — 189

$[\alpha]_D$=-7.7° ($CHCl_3$,c=1.00,24°C).

No.1a — 190

$[\alpha]_D$=-17.3° ($CHCl_3$,c=1.00,24°C).

No.1a — 191

$CDCl_3$ 300MHz
0.95-2.20(14H,m),2.30(1H,m),2.36(2H,d,J=6.9Hz),3.21(1H,m),4.25(2H,s),5.0 7(1H,d,J=7.8Hz),5.35-5.48(2H,m),7.25(1H,dd,J=1.8 and 8.1Hz),7.32-7.35(2H,m),7.59(1H,d,J=8.1Hz),7.94(1H,s),8.14(1H,d,J=2.7Hz),8.23(1H,d.d,J=2.7a nd8.7Hz).
IR($CHCl_3$):3386,3026,3015,2957,2877,2633,1702,1617,1573,1530,1348,1123 /cm.
$[\alpha]_D$= -6.1° ($CHCl_3$,c=1.01,25°C).

No.1a — 192

$CDCl_3$ 300MHz
0.92-2.20(14H,m),2.13(3H,m),3.23(1H,m),3.64(3H,s),3.94(3H,s),4.22(2H,s),4. 36(1H,d,J=7.8Hz),5.37-5.42(2H,m),7.16-7.42(6H,m),7.53(1H,d,J=8.4Hz),7.9 4(1H,s).
IR($CHCl_3$):3389,3022,3013,2953,2877,1716,1616,1560,1485,1340,1326,1124 /cm.
$[\alpha]_D$= -15.2° ($CHCl_3$,c=1.01,25°C).

No.1a — 193

$CDCl_3$ 300MHz

0.92-2.20(14H,m),2.25(1H,m),2.35(2H,t,J=7.2Hz),3.17(1H,m),4.22(2H,s),4.9 1(1H,d,J=7.5Hz),5.37-5.42(2H,m),7.13-7.43(6H,m),7.60(1H,d,J=8.1Hz),8.05(1H,s).
IR($CHCl_3$):3511,3387,3029,3020,3011,2957,2877,2651,1698,1614,1560,1505, 1320,1280,1252,1126 /cm.
$[\alpha]_D$= -0.9° ($CHCl_3$,c=1.00,25°C).

No.1b — 1

$CDCl_3$ 300MHz
0.98-1.56(15H,m),1.85-1.90(5H,m),2.23(1H,m),3.05(1H,m),3.66(3H,s),4.77(1 H,d,J=6.0Hz),5.08-5.28(2H,m),7.46(3H,m),7.38-7.54(2H,d,J=7.5Hz),7.72(2H, d,J=8.4Hz),7.93(2H,d,J=8.4Hz).
IR($CHCl_3$):3384,3028,2952,2876,1719,1595,1391,1322,1155/cm.
$[\alpha]_{436}$ +4.0~+6.0($CHCl_3$,c=1.00,23°C).
mp.96-98°C

No.1b — 2

$CDCl_3$ 300MHz
0.98-1.52(15H,m),1.85-1.90(5H,m),2.17(1H,m),3.00(1H,m),3.67(3H,s),4.05(2 H,s),4.83(1H,d,J=6.0Hz),5.05-5.23(2H,m),7.14(2H,d,J=7.2Hz),7.17-7.32(5H, m),7.78(2H,d,J=8.4Hz).
IR($CHCl_3$):3384,3026,2952,2874,1719,1595,1453,1407,1320,1180/cm.
$[\alpha]_D$=+2.5° ($CHCl_3$,c=1.02,24°C).

No.1b — 3

$CDCl_3$ 300MHz
0.96-2.05(20H,m),2.07(1H,m),3.07(1H,m),4.04(2H,s),5.21-5.35(2H,m),5.55(1 H,d,J=6.9Hz),7.14(2H,d,J=6.6Hz),7.20-7.32(5H,m),7.78(2H,d,J=8.1H).
IR($CHCl_3$):3250,3022,2950,1699,1596,1495,1453,1405,1318,1153/cm.
$[\alpha]_D$= +17.1° ($CHCl_3$,c=1.01,25°C).
mp.129-131°C.

No.1b — 4

$CDCl_3$ 200MHz
0.90-2.10(15H,m),1.19(3H,s),1.20(3H,s),3.11(1H,m),5.24-5.32(2H,m),5.70(1 H,d,J=6.6Hz),7.38-7.68(4H,m),7.96-8.04(2H,m),8.53(1H,d,J=1.4Hz).
IR($CHCl_3$):3384,3246,2958,1701,1632,1595,1468,1445,1322,1216,1202,1190, 1155,1122/cm.
$[\alpha]_D$=+10.8° ($CHCl_3$,c=0.51,23°C).

No.1b — 5

1.02-2.10(15H,m),1.16(6H,s),3.02(1H,m),4.09(3H,s),5.23-5.28(2H,m),5.76(1 H,d,J=7.2Hz),7.36-7.63(4H,m),7.97(1H,d,J=7.8Hz),8.16(1H,s).
IR($CHCl_3$):3369,2959,1702,1635,1585,1468,1454,1441,1415,1318,1222,1189, 1170,1154/cm.
$[\alpha]_D$=+9.9° ($CHCl_3$,c=1.00,23°C).

No.1c — 1

$CDCl_3$ 300MHz
1.10-2.02(14H,m),2.27(2H,t,J=7.5Hz),2.50(1H,m),2.89(3H,s),3.31(1H,m),3.6 4(3H,s),5.16-5.30(2H,m),7.34-7.42(3H,m),7.50-7.59(2H,m),7.62-7.68(2H,m), 7.76-7.82(2H,m).
IR($CHCl_3$):3020,2946,2868,2212,1727,1596,1495,1437,1339,1156,1135,1084 /cm.
$[\alpha]_D$=-16.1° ($CHCl_3$,c=1.05,25.0°C).
m.p.100-102°C

No.1c — 2

$CDCl_3$ 300MHz

1.10-2.05(14H,m),2.23(2H,t,J=7.5Hz),2.53(1H,m),2.91(3H,s),3.35(1H,m),3.6 2(3H,s),5.02-5.30(2H,m),7.50-7.60(3H,m),7.90-8.08(6H,m).
IR($CHCl_3$):3016,2946,2868,1728,1437,1398,1340,1160,1086 /cm.
$[\alpha]_D$=-32.5° ($CHCl_3$,c=1.00,25.0°C).

No.1c —3

CD_3OD 300MHz
1.15-2.05(14H,m),2.13(2H,t,J=7.2Hz),2.47(1H,m),2.91(3H,s),3.27(1H,m),4.9 0-5.30(2H,m),7.37-7.44(3H,m),7.53-7.61(2H,m),7.71-7.77(2H,m),7.81-7.87(2 H,m).
IR(KBr):3412,2999,2951,2871,2217,1560,1399,1243,1159,1137,1103,1084.
$[\alpha]_D$=-8.6° (CH_3OH,c=1.03,23°C).

No.1d —1

$CDCl_3$ 300MHz
1.00-2.16(15H,m),2.36(2H,t,J=7.2Hz),3.17(1H,m),3.33(3H,s),5.23-5.43(3H,m),7.51-7.59(3H,m),7.91-8.10(6H,m),9.02(1H,brs).
IR($CHCl_3$):3382,3268,3028,2954,2874,1715,1442,1400,1337,1162,1120,1089/cm.
$[\alpha]_D$=+40.0° ($CHCl_3$,c=0.53,22°C).

No.1d —2

$CDCl_3$ 300MHz
1.03-2.30(17H,m),3.03(1H,m),4.03(2H,s),5.26(2H,m),5.84(1H,br),5.25-5.29(1 H,d,J=6.6Hz),6.03(1H,br),7.14(2H,d,J=8.1Hz),7.26-7.31(5H,m),7.80(2H,d,J= 8.1Hz).
IR($CHCl_3$):3376,3002,2946,1669,1595,1492,1454,1406,1318,1154/cm.
$[\alpha]_D$=+4.3° ($CHCl_3$,c=1.00,23°C).

No.1d —3

$CDCl_3$ 300MHz
0.96-2.17(17H,m),2.33(2H,t,J=6.9Hz),3.01(1H,m),4.04(2H,s),5.10(1H,d,J=6. 6Hz),5.21-5.26(2H,m),7.14(2H,d,J=8.7Hz),7.16-7.32(5H,m),7.78(2H,d,J=8.4 Hz).
IR($CHCl_3$):3260,3020,2946,1711,1596,1492,1457,1407,1318,1154/cm.
$[\alpha]_D$=+9.3° ($CHCl_3$,c=1.09,25°C).

No.1d —4

$CDCl_3$ 300MHz
0.95-2.14(15H,m),2.34(2H,t,J=7.2Hz),3.09(1H,m),3.30(3H,s),4.04(2H,s),5.19 (1H,d,J=7.2Hz),5.22-5.39(2H,m),7.10-7.35(7H,m),7.81(2H,d,J=8.1Hz),9.10(1 H,brs).
IR($CHCl_3$):3382,3260,3028,2952,2874,2670,1713,1595,1492,1450,1405,1338, 1160,1120,1092/cm.
$[\alpha]_D$=+22.2° ($CHCl_3$,c=1.07,22°C).

No.1d —5

$CDCl_3$ 300MHz
1.00-2.10(14H,m),2.30-2.39(3H,m),3.15(1H,m),3.35(3H,s),5.18-5.40(3H,m),7. 41(1H,d.t.,J=0.9and7.8Hz),7.50-7.69(3H,m),7.88-8.15(2H,m),8.60(1H,d,J=1. 5Hz),9.06(1H,s).
IR($CHCl_3$):3382,3268,3028,2954,2874,1714,1442,1402,1338,1188,1155,1 121,1072/cm.
$[\alpha]_D$=+15.3° ($CHCl_3$,c=1.00,22°C).

No.1e —1

$CDCl_3$ 300MHz
1.19-2.45(19H,m),2.58(1H,m),5.63(1H,d,J=3.0Hz),7.42-7.65(4H,m),7.94-8.03 (2H,m),8.49-8.50(1H,m).
IR($CHCl_3$):3293,3024,1710,1595,1584,1467,1445,1410,1324,1222,1213,1206, 1190,1160/cm.

$[\alpha]_D$=-41.1° ($CHCl_3$,c=1.01,23°C).

No.1e — 2

$CDCl_3$ 300MHz
1.10-2.25(19H,m),2.94(1H,m),4.12(3H,s),5.53(1H,d,J=7.2Hz),7.39(1H,m),7.5 0-
7.62(3H,m),7.96(1H,d,J=7.5Hz),8.13(1H,s).
IR($CHCl_3$):3367,3025,2955,1711,1634,1600,1584,1468,1454,1440,1415,1342, 1317,1222,1189,1157/cm.
$[\alpha]_D$=+1.2° ($CHCl_3$,c=1.00,25°C).

No.1f — 1

$CDCl_3$ 300MHz
1.08-2.47(19H,m),2.56(1H,m),3.52(2H,t,J=6.6Hz),5.59(1H,d,J=2.4Hz),7.40-7. 66(4H,m),7.95-
8.04(2H,m),8.50(1H,d,J=1.8Hz).
IR($CHCl_3$):3624,3383,3295,2950,2877,1705,1595,1584,1468,1445,1405,1347, 1337,1324,1224,1190,1160/cm.
$[\alpha]_D$=-54.1° ($CHCl_3$,c=1.01,23°C).

No.1f — 2

$CDCl_3$ 300MHz
1.08-2.24(19H,m),2.94(1H,m),3.53(2H,t,J=6.3Hz),4.13(3H,s),5.47(1H,d,J=6. 6Hz),7.36-
7.63(4H,m),7.96(1H,d,J=6.3Hz),8.14(1H,s).
IR($CHCl_3$):3625,3368,3025,3013,2949,2877,1710,1634,1600,1584,1468,1454,
1440,1415,1342,1317,1232,1220,1189,1157/cm.
$[\alpha]_D$=-5.6° ($CHCl_3$,c=1.00,25°C).

No.1g — 1

$CDCl_3$ 200MHz
1.17-2.34(15H,m),3.22(1H,m),5.10-5.16(2H,m),5.45(1H,d,J=7.0Hz),7.35-7.66 (4H,m),7.95-
8.01(2H,m),8.51(1H,d,J=2.0Hz).
IR($CHCl_3$):3383,3275,2959,1707,1595,1584,1468,1445,1425,1319,1269,1248, 1190,1149,1123/cm.
$[\alpha]_D$=+64.3° ($CHCl_3$,c=1.01,23°C).

No.1g — 2

$CDCl_3$ 300MHz
1.10-2.15(13H,m),2.36(2H,t,J=7.2Hz),3.21(1H,m),4.09(3H,s),5.10-5.22(2H,m),5.43(1H,d,J=7.8Hz),7.36-
7.62(4H,m),7.96(1H,d,J=7.8Hz),8.12(1H,s).
IR($CHCl_3$):3366,2959,1708,1635,1600,1585,1467,1454,1440,1415,1345,1318, 1233,1189,1152/cm.
$[\alpha]_D$=+103.1° ($CHCl_3$,c=1.01,23°C).

No.1h — 1

$CDCl_3$ 300MHz
0.90-1.60(17H,m),1.83(1H,m),2.11(1H,m),2.22(2H,t,J=7.2Hz),3.07(1H,m),5. 11(1H,d,J=7.2Hz),7.38-
7.47(1H,m),7.50-7.60(1H,m),7.60-7.72(2H,m),7.88-8. 12(2H,m),8.54(1H,d,J=0.9Hz).
IR($CHCl_3$):3382,3274,2926,1707,1464,1442,1318,1266,1188,1153,1121,1105, 1071,1019/cm.
$[\alpha]_D$=-2.8° ($CHCl_3$,c=1.01,23°C).

No.1i — 1

$[\alpha]_{365}$ +50.9° ($CHCl_3$,c=1.01,24°C).

No.1i — 2

$CDCl_3$ 300MHz

0.98-1.70(11H,m),1.80-2.00(5H,m),2.19(1H,m),3.03(1H,m),3.64(2H,t,J=6.6H
z),4.05(2H,s),4.69(1H,d,J=6.6Hz),5.15(1H,m),5.25(1H,m),7.16(2H,d,J=7.2Hz),7.27-
7.32(5H,m),7.77(2H,d,J=8.4Hz).
IR($CHCl_3$):3376,3004,2946,2316,1596,1492,1453,1407,1318,1154/cm.
$[\alpha]_D$= +3.5° ($CHCl_3$,c=1.00,22°C).
mp.80.5-82.0°C

No.1j — 1

$[\alpha]_{436}$=-7.5±0.5 ° ($CHCl_3$,c=1.05,22°C).

No.1j — 2

$[\alpha]_D$=-9.7±0.5 ° ($CHCl_3$,c=1.06,22°C).

No.1j — 3

$[\alpha]_D$=+15.0±0.5 ° (CH_3OH,c=1.06,24.5°C).
mp.101-108°C

No.1j — 4

$[\alpha]_D$=-28.0±0.6 ° ($CHCl_3$,c=1.06,24°C).
mp.159-161°C

1j — 5

$[\alpha]_D$=-12.5±0.5 ° ($CHCl_3$,c=1.04,23°C).
mp.99-101°C

No.1j — 6

$CDCl_3$ 300MHz
0.90-2.03(14H,m),2.20(1H,m),2.30(2H,t,J=7.3Hz),3.00(1H,m)3.68(3H,s),4.76 (1H,d,J=6.8Hz),5.13-
5.35(2H,m),7.01-7.08(4H,m),7.19-7.26(1H,m),7.37-7.46 (2H,m),7.80-7.84(2H,m).
IR($CHCl_3$):3382,3280,3080,3016,2952,2900,1727,1582,1486,1432,1322,1150/cm.
$[\alpha]_D$= -31.0° ($CHCl_3$,c=1.05,26°C).

No.1j — 7

$CDCl_3$ 300MHz
0.91-2.09(14H,m),2.15(1H,m),2.35(2H,t,J=7.5Hz),3.01(1H,m),5.17(1H,d,J=6. 8Hz),5.21-5.34(2H,m),7.01-
7.08(4H,m),7.15-7.27(1H,m),7.37-7.43(2H,m),7.8 0-7.85(2H,m).
IR($CHCl_3$):3474,3386,3270,3024,2958,2900,2675,1711,1584,1488,1420,1323, 1298,1150/cm.
$[\alpha]_D$= -13.4° ($CHCl_3$,c=1.01,26°C).

No.1j — 8

$CDCl_3$ 300MHz
0.95-2.14(13H,m),2.30(2H,t,J=7.5Hz),2.36(1H,m),2.84(1H,m),2.91(1J=4.8Hz),3.66(3H,s),5.33-5.52(2H,m),6.82-
6.87(1H,m),6.93-7.00(2H,m),7.09-7.15(4H, m),7.28-7.36(2H,m),7.54-7.59(1H,m).
IR($CHCl_3$):3350,3010,2950,2880,1728,1603,1582,1489,1461,1438,1360,1160 /cm.
$[\alpha]_D$= +75.1° ($CHCl_3$,c=1.13,26°C).

No.1j — 9

$CDCl_3$ 300MHz
0.95-2.03(14H,m),2.20(1H,m),2.29(2H,t,J=7.5Hz),3.06(1H,m),3.68(3H,s),4.9 8(1H,d,J=7.4Hz),5.14-

5.34(2H,m),7.46-7.54(2H,m),7.60-7.68(1H,m),7.75-7.8 0(2H,m),7.88-7.92(2H,m),7.99-8.03(2H,m).
IR($CHCl_3$):3384,3280,3020,2960,2888,1727,1662,1600,1316,1273,1163/cm.
$[\alpha]_D$= -41.0° ($CHCl_3$,c=1.17,26°C).

No.1j — 10

$CDCl_3$+CD_3OD 300MHz
0.94-2.08(14H,m),2.21(1H,m),2.34(2H,t,J=6.2Hz),3.04(1H,m),5.21-5.35(2H, m),5.40(1H,m),7.49-7.58(2H,m),7.64-7.68(1H,m),7.79-8.06(6H,m).
IR($CHCl_3$):3475,3370,3250,3018,2956,2976,2650,1709,1662,1595,1445,1420, 1395,1317,1274,1163/cm.
$[\alpha]_D$= -17.1° ($CHCl_3$,c=1.13,25°C).

No.1j — 11

$CDCl_3$ 300MHz
1.06-1.98(14H,m),2.24-2.29(3H,m),3.13(1H,m),3.66(3H,s),5.10-5.24(2H,m),5. 40(1H,d,J=6.3Hz),7.39-7.49(3H,m),7.59-7.64(3H,m),7.80-7.83(2H,m),8.08-8. 11(1H,m).
IR($CHCl_3$):3302,3012,2948,2905,1727,1661,1593,1435,1332,1312,1287,1271, 1165/cm.
$[\alpha]_D$= +15.6° ($CHCl_3$,c=1.03,26°C).

No.1j — 12

$CDCl_3$ 300MHz
1.08-1.98(14H,m),2.23(1H,m),2.33(2H,t,J=7.5Hz),3.16(1H,m),5.18-5.26(2H, m),5.39-5.45(1H,m),7.39-7.49(3H,m),7.60-7.64(3H,m),7.80-7.83(2H,m),8.09-8.12(1H,m).
IR($CHCl_3$):3325,3022,2956,2872,2680,1708,1662,1603,1598,1425,1340,1316, 1288,1271,1165/cm.
$[\alpha]_D$= +9.7° ($CHCl_3$,c=0.52,25°C).

No.1j — 13

$CDCl_3$ 300MHz
0.95-2.00(14H,m),2.20(1H,m),2.27(2H,t,J=6.3Hz),3.03(1H,m),3.67(3H,s),4.9 9(1H,d,J=6.6Hz),5.12-5.31(2H,m),7.47-7.55(2H,m),7.60-7.69(2H,m),7.76-7.8 1(2H,m),7.96-8.05(1H,m),8.08-8.14(1H,m),8.27-8.28(1H,m).
IR($CHCl_3$):3674,3538,3376,3276,3012,2948,2860,1726,1662,1595,1440,1335, 1317,1297,1274,1166,1150/cm.
$[\alpha]_D$=+10.2° ($CHCl_3$,c=1.00,25°C).

No.1j — 14

$CDCl_3$ 300MHz
0.93-2.08(14H,m),2.21(1H,m),2.32(2H,t,J=6.3Hz),3.00(1H,m),5.20-5.36(2H, m),5.38(1H,d,J=6.2Hz),7.50-7.55(2H,m),7.63-7.71(2H,m),7.77-7.81(2H,m),7. 99-8.04(1H,m),8.10-8.18(1H,m),8.32-8.36(1H,m).
IR($CHCl_3$):3674,3480,3374,3258,3012,2950,2875,2650,1709,1662,1598,1418, 1335,1317,1274,1143/cm.
$[\alpha]_D$=+61.0° ($CHCl_3$,c=1.19,25°C).

No.1j — 15

$CDCl_3$ 300MHz
0.90-2.00(14H,m)2.19(1H,m)2.30(2H,t,J=7.3Hz),3.01(1H,m),3.67(3H,s),4.8 2(1H,d,J=6.6Hz),5.14-5.34(2H,m),7.36-7.39(3H,m),7.53-7.57(2H,m),7.62-7.6 6(2H,m),7.83-7.88(2H,m).
IR($CHCl_3$):3376,3276,3010,2948,2868,2212,1727,1597,1500,1437,1325,1161/cm.
$[\alpha]_D$=-7.2° ($CHCl_3$,c=1.00,26°C).

No.1j — 16

$CDCl_3$ 300MHz
0.93-2.03(14H,m),2.15(1H,m),2.36(2H,t,J=7.5Hz),3.05(1H,m),5.20-5.40(3H, m),7.36-7.39(3H,m),7.55-7.66(4H,m),7.84-7.88(2H,m).

IR($CHCl_3$):3470,3376,3260,3012,2950,2868,2675,2212,1708,1596,1503,1416, 1396,1322,1160.
$[\alpha]_D$=-22.4° ($CHCl_3$,c=1.00,26°C).

No.1j — 17

$CDCl_3$ 300MHz
1.00-1.60(9H,m)1.79-1.89(5H,m)2.17(1H,brs),2.23(2H,t,J=7.2Hz),3.03(1H, m),5.10-5.23(2H,m),5.49(1H,d,J=6.6Hz),7.40(1H,t,J=7.4Hz),7.53(1H,t,J=7.2 Hz),7.60-7.68(2H,m),7.98-8.03(2H,m),8.55(1H,d,J=1.5Hz).
IR($CHCl_3$):3516,3384,3270,2666,1708,1632,1595,1584,1467,1445,1425,1374, 1345,1321,1269,1248,1218/cm.
$[\alpha]_D$= -7.8°($CHCl_3$,c=1.01,22°C).

No.1j — 18

$CDCl_3$ 300MHz
0.90-2.03(14H,m),2.19(1H,m),2.30(2H,t,J=7.5Hz),3.00(1H,m),3.67(3H,s),4.8 0(1H,d,J=6.4Hz),5.14-5.35(2H,m),6.99-7.04(2H,m),7.16-7.22(2H,m),7.34-7.4 9(4H,m),7.57-7.61(1H,m).
IR($CHCl_3$):3376,3276,3012,2948,2875,1727,1583,1488,1471,1432,1330,1311, 1150/cm.
$[\alpha]_D$=+54.0° ($CHCl_3$,c=0.99,25°C).

No.1j — 19

$CDCl_3$ 300MHz
0.91-2.09(14H,m),2.15(1H,m),2.34(2H,t,J=7.5Hz),3.01(1H,m),5.16(1H,d,J=6. 6Hz),5.24-5.40(2H,m),7.01-7.08(2H,m),7.15-7.25(2H,m),7.35-7.53(4H,m),7.5 9-7.65(1H,m).
IR($CHCl_3$):3470,3376,3260,3012,2950,2875,2640,1708,1583,1488,1471,1430, 1335,1305,1149/cm.
$[\alpha]_D$= -21.0° ($CHCl_3$,c=1.30,25°C).

No.1j — 20

$CDCl_3$ 300MHz
1.17(1H,m),1.26-1.34(2H,m),1.54-2.24(11H,m),2.31(2H,t,J=7.4Hz),2.48(1H, brs),3.37(1H,m),3.67(3H,s),5.35-5.50(2H,m),7.39-7.68(9H,m).
IR($CHCl_3$):3377,1727,1601,1435,1362,1168/cm.

No. 1j — 21

$CDCl_3$ 300MHz
1,10-2.25(14H,m),2.36(2H,t,J=7.2Hz),2.47(1H,m),2.89(1H,m),5.35-5.53(2H, m),5.63(1H,d,J=7.2Hz),7.40-7.71(9H,m).
IR($CHCl_3$):3674,3496,3374,3234,3010,2952,2870,2640,1730(sh),1710,1605,1 485,1425,1360,1167/cm.
$[\alpha]_D$=-43.0° ($CHCl_3$,c=1.01,25°C).

No.1j — 22

$CDCl_3$ 300MHz
0,98-1.95(14H,m),2.25-2,31(3H,m),2.95(1H,m),5.19-5.30(2H,m),5.33(1H,d,J =3.9Hz),6.58(1H,d,J=7.5Hz),6.80(1H,t,J=7.5Hz),6.99-7.05(1H,m),7.44-7.53(6H,m),7.60-7.73(9H,m),7.94-7.73(3H,m),8.23-8.26(2H,m),10.66(1H,s).
IR($CHCl_3$):3475,3372,3260,3008,2952,2868,2722,1725,1710(sh),1663,1590,1 571,1525,1448,1437,1345,1314,1161,1112/cm.
$[\alpha]_D$=+12.9° ($CHCl_3$,c=0.12,23°C).

No.1j — 23

$CDCl_3$ 300MHz
0.94~1.94(14H,m),2.23-2.30(3H,m),2.98(1H,m),3.68(3H,s),5.09(1H,d,J=6.2H z),5.15-5.28(2H,m),7.14-7.22(1H,m),7.34-7.42(2H,m),7.68-7.73(2H,m),7.89-8. 03(4H,m),8.51(1H,s).

IR($CHCl_3$):3372,3275,1724,1673,1599,1438,1320,1161/cm.
$[\alpha]_D$= +17.0° ($CHCl_3$,c=1.38,25°C).

No.1j — 24

$CDCl_3$+CD_3OD 300MHz
0.96-2.05(14H,m),2,25-2.34(3H,m),2.92(1H,m),5.16-5.34(2H,m),7.14-7.22(1 H,m),7.29-7.42(2H,m),7.70(2H,d,J=7.6Hz),7.92-8.05(4H,m).
IR($CHCl_3$):3616,3426,3375,3010,2950,2828,2645,1708,1672,1599,1439,1323, 1161/cm.
$[\alpha]_D$=+21.0° (CH_3OH,c=1.00,22°C).

No.1j — 25

$CDCl_3$ 300MHz
1.03(1H,m),1.18-2.01(13H,m),2.20(1H,brs),2.27(2H,t,J=7.4Hz),3.08(1H,m),3. 66(3H,s),5.11(1H,d,J=6.6Hz),5.14-5.34(2H,m),7.54-7.62(3H,m),8.04-8.32(6H, m).
IR($CHCl_3$):3384,3278,1726,1605,1484,1448,1331,1161/cm.

No.1j — 26

$CDCl_3$+CD_3OD 300MHz
1,03-2.10(14H,m),2.22(1H,m).2.31(2H,t,J=7.5Hz),2.98(1H,m),5.23-5.38(2H, m),7.55-7.66(3H,m),8.05-8.08(2H,m),8.14-8.18(2H,m),8.28-8.31(2H,m).
IR(Nujol):3260,2720,2660,1711,1545,1460,1317,1163/cm.
$[\alpha]_D$=+15.8° (CH_3OH,c=1.01,22°C).

No.1j — 27

$[\alpha]_D$= +16.7° ($CHCl_3$,c=1.00,23°C).

No.1j — 28

$CDCl_3$ 300MHz
1.01(1H,m),1.14-1.29(2H,m),1.46-2.19(11H,m),2.33(2H,t,J=7.2Hz),2.41(1H, brs),3.18-3.21(5H,m),3.68(3H,s),3.73-3.76(4H,m),4.37(1H,d,J=7.2Hz),5.35-5. 45(2H,m).
IR($CHCl_3$):3392,1727,1435,1335,1148/cm.
$[\alpha]_D$= +10.7°($CHCl_3$,c=1.39,26°C).

No.1j — 29

$CDCl_3$ 300MHz
1.00(1H,m),1.20-1.29(2H,m),1,48-2.25(12H,m),2.37(2H,t,J=7.2Hz),,3.17-3.2 2(5H,m),3.74-3.79(4H,m),4.79(1H,d,J=7.8Hz),5.34-5.54(2H,m).
IR($CHCl_3$):3470,3390,3270,2675,1709,1455,1420,1315,1147/cm.
$[\alpha]_D$= +16.8°($CHCl_3$,c=1.42,26°C).

No.1k — 1

$[\alpha]_D$= -25.4° ($CHCl_3$,c=1.08,23°C).

No.1k — 2

$CDCl_3$ 200MHz
1.07-2.28(14H,m),2.32(2H,t,J=7.4Hz),2.63(1H,m),3.63(3H,s),3.93(1H,m),5.3 0-5.52(2H,m),6.35(1H,d,J=7.0Hz),7.48-7.60(3H,m),7.88-8.02(6H,m).
IR($CHCl_3$):3438,3002,2946,2868,1727,1652,1514,1485,1363,1310,1245,1154 /cm.
$[\alpha]_D$=-80.4° ($CHCl_3$,c=1.01,24.0°C).

No.1k — 3

$CDCl_3$ 200MHz
1.10-2.26(14H,m),2.37(2H,t,J=7.2Hz),2.60(1H,m),3.93(1H,m),5.30-5.50(2H, m),6.33(1H,d,J=7.5Hz),7.48-7.58(3H,m),7.88-7.99(6H,m).
IR($CHCl_3$):3446,3004,2952,2874,1709,1652,1515,1485,1305,1153 /cm.
$[\alpha]_D$=-96.4° ($CHCl_3$,c=1.05,23.0°C).

No.1k — 4

$CDCl_3$ 300MHz
1.05-2.17(14H,m),2.38(2H,t,J=7.2Hz),2.52(1H,m),3.81(1H,m),5.33-5.50(2H, m),6.08(1H,d,J=7.6Hz),7.39-7.53(3H,m),7.57-7.62(6H,m).
IR($CHCl_3$):3420,3250,3008,2948,2870,2660,2208,1735(sh),1705,1640,1500/cm.
$[\alpha]_D$=-21.9±0.6° ($CHCl_3$,c=1.02,22°C).

No.1k — 5

$CDCl_3$ 300MHz
1.05-2.14(14H,m),2.38(2H,t,J=7.2Hz),2.51(1H,m),3.81(1H,m),5.34-5.46(2H, m),6.07(1H,d,J=7.6Hz),7.33-7.56(5H,m).
IR($CHCl_3$):3422,3250,3010,2950,2876,2664,2558,2210,1735(sh),1705,1645,1 502,1441,1410,1307,1276/cm.
$[\alpha]_D$=-63.6±1.9° ($CHCl_3$,c=0.56,22°C).

No.1k — 6

$CDCl_3$ 300MHz
1.04-2.24(14H,m),2.36(2H,t,J=7.5Hz),2.58(1H,m),3.88(1H,m),5.30-5.43(2H, m),6.21(1H,d,J=7.2Hz),7.41-7.49(3H,m),7.73-7.77(2H,m).
IR($CHCl_3$):3447,3011,2955,1708,1653,1603,1578,1515,1486,1457,1312,1211, 1164/cm.
$[\alpha]_D$=-60.3° ($CHCl_3$,c=1.00,23°C).

No.1k — 7

$CDCl_3$ 300MHz
1.04-2.22(14H,m),2.36(2H,t,J=7.2Hz),2.57(1H,m),3.87(1H,m),5.30-5.44(2H, m),6.17(1H,d,J=8.7Hz),6.99-7.40(7H,m),7.73(2H,d,J=7.5Hz).
IR($CHCl_3$):3449,3013,2955,1739,1708,1651,1609,1588,1522,1487,1243,1227, 1169/cm.
$[\alpha]_D$=-60.2° ($CHCl_3$,c=0.92,23°C).

No.1k — 8

$CDCl_3$ 300MHz
1.04-2.25(14H,m),2.34(2H,t,J=7.5Hz),2.56(1H,m),3.87(1H,m),5.30-5.44(2H, m),6.19(1H,d,J=7.5Hz),6.83-6.94(6H,m),7.69(2H,d,J=8.7Hz).
IR($CHCl_3$):3599,3455,3012,2955,1711,1644,1604,1577,1524,1507,1492,1290, 1236,1197,1170/cm.
$[\alpha]_D$=-47.7° ($CHCl_3$,c=1.01,22°C).

No.1k — 9

$CDCl_3$ 300MHz
1.04-2.20(14H,m),2.31(3H,s),2.36(2H,t,J=7.2Hz),2.56(1H,m),3.86(1H,m),5.30-5.43(2H,m),6.16(1H,d,J=7.2Hz),7.00-7.11(6H,m),7.74(2H,d,J=8.7Hz).
IR($CHCl_3$):3450,3010,2955,1750,1709,1651,1609,1596,1523,1489,1370,1247, 1227,1183/cm.
$[\alpha]_D$=-54.7° ($CHCl_3$,c=1.01,22°C).

No.1k — 10

$CDCl_3$ 300MHz
1.04-2.22(14H,m),2.35(2H,t,J=7.2Hz),2.56(1H,m),3.82(3H,s),3.86(1H,m),5.3 0.5-
43(2H,m),6.17(1H,d,J=6.9Hz),6.89-7.01(6H,m),7.70(2H,d,J=8.7Hz).
IR($CHCl_3$):3023,2955,1742,1708,1649,1613,1602,1577,1522,1507,1490,1227, 1210,1170/cm.
$[\alpha]_D$=-58.1° ($CHCl_3$,c=1.01,22°C).

No.1m — 1

$CDCl_3$ 300MHz
1.06-2.25(14H,m),2.32(2H,t,J=7.4Hz),2.61(1H,m),3.63(3H,s),3.91(1H,m),5.3 3-
5.47(2H,m),6.24(1H,d,J=6.9Hz),7.35-7.38(3H,m),7.53-7.60(4H,m),7.75-7.7 8(2H,m).
IR($CHCl_3$):3438,3008,2946,2875,2212,1732,1650,1605,1519,1496/cm.
$[\alpha]_D$= +76° ($CHCl_3$,c=1.39,24°C)

No.1m — 2

$CDCl_3$ 300MHz
1.05-2.20(14H,m),2.36(2H,t,J=6.2Hz),2.59(1H,m),3.89(1H,m),5.29-5.48(2H, m),6.26(1H,d,J=7.0Hz),7.26-
7.38(3H,m),7.52-7.60(4H,m),7.73-7.77(2H,m).
IR($CHCl_3$):3444,3012,2952,2874,2664,2214,1718(sh),1708,1649,1605,1520,1 498/cm.
$[\alpha]_D$= +81.4° ($CHCl_3$,c=1.01,23°C)

No.1m — 3

$CDCl_3$ 300MHz
1.06-2.23(14H,m),2.32(2H,t,J=7.0Hz),2.62(1H,m),3.63(3H,s),3.93(1H,m),5.3 0-
5.50(2H,m),6.28(1H,d,J=7.0Hz),7.38-7.51(3H,m),7.58-7.67(4H,m),7.83-7.8 8(2H,m).
IR($CHCl_3$):3438,3008,2948,2875,1783(w),1727,1650,1608,1580(w),1523,150 1,1482/cm.
$[\alpha]_D$= +59° ($CHCl_3$,c=1.49,25°C)

No.1m — 4

$CDCl_3$ 300MHz
1.08-2.25(14H,m),2.36(2H,t,J=7.4Hz),2.59(1H,m),3.91(1H,m),5.28-5.48(3H, m),6.29(1H,d,J=7.4Hz),7.38-
7.50(3H,m),7.61-7.67(4H,m),7.81-7.86(2H,m).
IR($CHCl_3$):3436,3010,2948,2868,1727,1715(sh),1649,,1615(w),1524,1502,14 82,1372/cm.
$[\alpha]_D$= +72° ($CHCl_3$,c=0.98,25°C)

No.1m — 5

$CDCl_3$ 300MHz
1.09-2.20(14H,m),2.32(2H,t,J=7.2Hz),2.63(1H,m),3.63(3H,s),3.92(1H,m),5.3 1-
5.51(2H,m),6.35(1H,d,J=7.0Hz),7.51-7.60(3H,m),7.92-7.97(6H,m).
IR($CHCl_3$):3436,3008,2946,2875,1727,1652,1608(w),1515,1484/cm.
$[\alpha]_D$= +82° ($CHCl_3$,c=0.99,25°C)

No.1m — 6

$CDCl_3$ 300MHz
1.09-2.23(14H,m),2.37(2H,t,J=7.2Hz),2.60(1H,m),3.92(1H,m),5.30-5.49(2H, m),6.32(1H,d,J=7.4Hz),7.51-
7.55(3H,m),7.85-7.98(6H,m).
IR($CHCl_3$):3436,3010,2950,2875,2670,1727,1715(sh),1650,1605(w),1515,148 4/cm.
$[\alpha]_D$= +84° ($CHCl_3$,c=1.54,25°C)

No.1m — 7

$CDCl_3$ 300MHz
1.03-2.18(14H,m),2.32(2H,t,J=7.4Hz),2.59(1H,m),3.64(3H,s),3.89(1H,m),5.2 9-
5.49(2H,m),6.16(1H,d,J=7.8Hz),6.98-7.06(4H,m),7.14-7.20(1H,m),7.34-7.4 1(2H,m),7.73-7.78(2H,m).
IR($CHCl_3$):3438,3008,2946,2868,1727,1648,1610,1586,1519,1485/cm.
$[\alpha]_D$= +54° ($CHCl_3$,c=1.29,25°C).

No. 1m — 8

$CDCl_3$ 300MHz
1.06-2.21(14H,m),2.36(2H,t,J=7.5Hz),2.58(1H,m),3.88(1H,m),5.31-5.46(2H, m),6.17(1H,d,J=6.9Hz),6.99-
7.05(4H,m),7.15-7.21(1H,m),7.36-7.41(2H,m),7. 72-7.75(2H,m).
IR($CHCl_3$):3436,3010,2948,2868,2675,1730(sh),1709,1647,1608,1586,1520,1 485/cm.
$[\alpha]_D$= +56° ($CHCl_3$,c=0.97,25°C)

No.1m — 9

$CDCl_3$ 300MHz
1.05-2.18(14H,m),2.29-2.34(5H,m),2.59(1H,m),3.64(3H,s),3.89(1H,m),5.32-5.
46(2H,m),6.16(1H,d,J=7.5Hz),7.00-7.11(6H,m),7.74-7.77(2H,m).
IR($CHCl_3$):3440,3010,2946,2868,1729,1649,1595,1519,1488/cm.
$[\alpha]_D$= +47° ($CHCl_3$,c=0.82,25°C).

No.1m — 10

$CDCl_3$ 300MHz
1.04-2.20(14H,m),2.31-2.39(5H,m),2.57(1H,m),3.87(1H,m),5.28-5.47(2H,m), 6.17(1H,d,J=7.0Hz),6.99-
7.12(6H,m),7.72-7.76(2H,m).
IR($CHCl_3$):3674,3572,3438,3010,2948,2868,2626,1748,1710,1648,1615,1595, 1520,1489/cm.
$[\alpha]_D$= +51° ($CHCl_3$,c=0.91,25°C)

No.1m — 11

$CDCl_3$ 300MHz
1.04-2.16(14H,m),2.31(2H,t,J=7.2Hz),2.59(1H,m),3.63(3H,s),3.89(1H,m),5.2 9-
5.49(2H,m),6.24(1H,d,J=7.4Hz),6.54(1H,s),6.83-6.93(6H,m),7.69-7.73(2H, m).
IR($CHCl_3$):3674,3588,3438,3296,3010,2946,2868,1725,1646,1603,1520,1504, 1489/cm.
$[\alpha]_D$= +51° ($CHCl_3$,c=0.91,25°C)

No.1m — 12

$CDCl_3$ 300MHz
1.04-2.21(14H,m),2.33(2H,t,J=8.0Hz),2.56(1H,m),3.87(1H,m),5.28-5.48(2H,
m),6.23(1H,d,J=8.0Hz),6.75(1H,m),6.87-6.94(6H,m),7.66-7.71(2H,m),9.63(1 H,brs).
IR($CHCl_3$):3674,3582,3436,3275,3010,2950,2868,2675,1727,1710(sh),1643,1 603,1522,1504,1490/cm.
$[\alpha]_D$= +30° ($CHCl_3$,c=0.97,25°C)

No.1m — 13

$CDCl_3$ 300MHz
1.01-2.18(14H,m),2.31(2H,t,J=7.4Hz),2.58(1H,m),3.63(3H,s),3.82(3H,s),3.89 (1H,m),5.29-
5.48(2H,m),6.14(1H,d,J=7.0Hz),6.88-7.02(6H,m),7.70-7.74(2H, m).
IR($CHCl_3$):3442,3402,3004,2946,2868,1727,1648,1600,1518,1499/cm.
$[\alpha]_D$=+42° ($CHCl_3$,c=1.82,26°C)

No.1m — 14

$CDCl_3$ 300MHz
1.05-2.21(14H,m),2.35(2H,t,J=7.2Hz),2.55(1H,m),3.82(3H,s),3.88(1H,m),5.2 7-
5.46(2H,m),6.16(1H,d,J=7.2Hz),6.88-7.02(6H,m),7.68-7.73(2H,m).
IR($CHCl_3$):3438,3012,2948,2870,2650,1730(sh),1709,1647,1615(sh),1601,15 19,1492/cm.
$[\alpha]_D$=+64° ($CHCl_3$,c=0.70,25°C)

No.1m — 15

$CDCl_3$ 300MHz
1.05-2.20(14H,m),2.29-2.36(5H,m),2.62(1H,m),3.63(3H,s),3.92(1H,m),5.30-5.
50(2H,m),6.25(1H,d,J=7.2Hz),7.16-7.21(2H,m),7.59-7.64(4H,m),7.83-7.87(2 H,m).
IR($CHCl_3$):3446,3010,2946,2868,1745(sh),1728,1650,1615,1525,1507,1486/cm.
$[\alpha]_D$=+65.0° ($CHCl_3$,c= 1.02,23°C)

No.1m — 16

$CDCl_3$ 300MHz

1.08-2.21(14H,m),2.34-2.40(5H,m),2.59(1H,m),3.90(1H,m),5.29-5.48(2H,m),
6.29(1H,d,J=7.0Hz),7.18(2H,d,J=8.6Hz),7.58-7.64(4H,m),7.83(2H,d,J=8.2Hz

IR($CHCl_3$):3438,3012,2948,2870,2622,1749,1710,1649,1610,1526,1508,1487/cm.

$[\alpha]_D$=+66° ($CHCl_3$,c=1.21,24°C)

No.1m — 17

$CDCl_3$ 300MHz
1.06-2.19(14H,m),2.32(2H,t,J=7.2Hz),2.62(1H,m),3.63(3H,s),3.93(1H,m),5.3 0-
5.50(2H,m),6.32(1H,d,J=7.6Hz),6.41(1H,s),6.94(2H,d,J=9.0Hz),7.47(2H,d,
J=9.0Hz),7.58(2H,d,J=8.6Hz),7.81(2H,d,J=8.6Hz).
IR($CHCl_3$):3580,3434,3284,3010,2946,2868,1726,1646,1606,1528,1490/cm.
$[\alpha]_D$=+62.4° ($CHCl_3$,c=1.01,23°C)

No.1m — 18

$CDCl_3$+CD_3OD 300MHz
1.11-2.18(14H,m),2.32(2H,t,J=7.4Hz),2.59(1H,m),3.88(1H,m),5.30-5.49(2H,
m),6.55(1H,d,J=7.0Hz),6.92(2H,d,J=8.6Hz),7.47(2H,d,J=8.6Hz),7.59(2H,d,J =8.6Hz),7.79(2H,d,J=8.2Hz).
IR(Nujol):3398,3175,2725,1696,1635,1601,1531,1510/cm.
$[\alpha]_D$=+99.5° (CH_3OH,c=1.011,25°C)

No.1m — 19

$CDCl_3$ 300MHz
1.05-2.20(14H,m),2.32(2H,t,J=7.4Hz),2.61(1H,m),3.63(3H,s),3.86(3H,s),3.94 (1H,m),5.30-
5.50(2H,m),6.24(1H,d,J=7.0Hz),6.99(2H,d,J=8.6Hz),7.53-7.63(4 H,m),7.82(2H,d,J=8.6Hz).
IR($CHCl_3$):3440,3006,2946,2875,1726,1649,1606,1527,1510,1489/cm.
$[\alpha]_D$=+68° ($CHCl_3$,c=0.88,26°C)

No.1m — 20

$CDCl_3$ 300MHz
1.09-2.20(14H,m),2.35(2H,t,J=7.3Hz),2.58(1H,m),3.85(3H,s),3.89(1H,m),5.2 8-
5.48(2H,m),6.35(1H,d,J=7.2Hz),6.98(2H,d,J=8.8Hz),7.51-7.61(4H,m),7.81(2H,d,J=8.4Hz),8.34(1H,brs).
IR($CHCl_3$):3446,3012,2952,2881,2640,1730(sh),1707,1647,1606,1527,1510,1 489/cm.

$[\alpha]_D$=+83° ($CHCl_3$,c=1.00,25°C).

No.1m — 21

$CDCl_3$ 300MHz
1.05-2.14(14H,m),2.37(2H,t,J=7.2Hz),2.51(1H,m),3.81(1H,m),5.34-5.46(2H, m),6.11(1H,d,J=7.5Hz),7.33-7.48(3H,m),7.53-7.55(2H,m).
IR($CHCl_3$):3420,3250,3008,2948,2870,2660,2210,1735(sh),1705,1645,1503,1 441,1409/cm.
$[\alpha]_D$=+59.2±1.0° ($CHCl_3$,c=1.023,22°C).

No.1m — 22

$CDCl_3$ 300MHz
1.05-2.17(14H,m),2.37(2H,t,J=7.2Hz),2.52(1H,m),3.82(1H,m),5.32-5.47(2H, m),6.20(1H,d,J=7.6Hz),7.38-7.53(3H,m),7.58-7.61(6H,m),9.11(1H,brs).
IR($CHCl_3$):3420,3250,3010,2984,2870,2675,2208,1730(sh),1705,1640,1500,1 406/cm.
$[\alpha]_D$=+57.4° ($CHCl_3$,c=1.83,23°C).

No.1m — 23

$CDCl_3$ 300MHz
1.05-2.18(14H,m),2.31(2H,t,J=7.5Hz),2.60(1H,m),3.63(3H,s),3.90(1H,m),5.3 2-5.47(2H,m),6.22(1H,d,J=6.9Hz),7.40-7.49(3H,m),7.76-7.79(2H,m).
IR($CHCl_3$):3438,3008,2946,2868,1727,1651,1603,1585,1512,1484/cm.
$[\alpha]_D$=+52° ($CHCl_3$,c=1.49,25°C).

No.1m — 24

$CDCl_3$ 300MHz
1.05-2.21(14H,m),2.36(2H,t,J=7.2Hz),2.57(1H,m),3.89(1H,m),5.28-5.47(2H, m),6.22(1H,d,J=7.0Hz),7.39-7.55(3H,m),7.73-7.79(2H,m).
IR($CHCl_3$):3676,3572,3436,3010,2948,2875,1730(sh),1709,1650,1600,1580,1 514,1484/cm.
$[\alpha]_D$=+57° ($CHCl_3$,c=0.97,26°C).

No.1m — 25

$CDCl_3$ 300MHz
1.04-2.18(14H,m),2.28-2.35(5H,m),2.59(1H,m),3.62(3H,s),3.88(1H,m),5.29-5.49(2H,m),6.20(1H,d,J=7.2Hz),7.15(2H,d,J=9.0Hz),7.80(2H,d,J=8.8Hz).
IR($CHCl_3$):3436,3010,2946,2868,1752,1727,1653,1602,1519,1491/cm.
$[\alpha]_D$=+53° ($CHCl_3$,c=1.63,25°C).

No.1m — 26

$CDCl_3$ 300MHz
1.05-2.19(14H,m),2.32-2.38(5H,m),2.56(1H,m),3.88(1H,m),5.29-5.47(2H,m),
6.25(1H,d,J=7.4Hz),7.15(2H,d,J=9.0Hz),7.78(2H,d,J=8.6Hz).
IR($CHCl_3$):3434,3016,3006,2948,2880,2622,1752,1730(sh),1710,1651,1605,1 520,1492/cm.
$[\alpha]_D$=+58° ($CHCl_3$,c=3.68,24°C)

No.1m — 27

$CDCl_3$ 300MHz
1.05-2.16(14H,m),2.30(2H,t,J=7.5Hz),2.57(1H,m),3.62(3H,s),3.87(1H,m),5.2 7-5.47(2H,m),6.32(1H,d,J=7.4Hz),6.85(2H,d,J=8.6Hz),7.62(2H,d,J=8.6Hz),8. 35(1H,s).
IR($CHCl_3$):3580,3450,3216,3010,2946,2868,1726,1640,1608,1584,1528,1496/cm.
$[\alpha]_D$=+56.2° ($CHCl_3$,c=0.713,23°C)

No.1m — 28

$CDCl_3$ 200MHz
1.10-2.25(14H,m),2.32(2H,t,J=7.2Hz),2.55(1H,brs),3.82-3.93(1H,m),5.27-5.47(2H,m),6.25(1H,d,J=7.4Hz),6.86(2H,d,J=8.6Hz),7.62(2H,d,J=8.6Hz).
IR($CHCl_3$):3438,3242,2675,1730(sh),1708,1639,1607,1585/cm.

No.1m — 29

$CDCl_3$ 300MHz
1.05-2.18(14H,m),2.31(2H,t,J=7.4Hz),2.58(1H,m),3.64(3H,s),3.85(3H,s),3.89 (1H,m),5.29-5.48(2H,m),6.14(1H,d,J=6.6Hz),6.92(2H,d,J=9.0Hz),7.74(2H,d, J=9.0Hz).
IR($CHCl_3$):3445,3008,2946,2868,1727,1646,1606,1578,1523,1493/cm.
$[\alpha]_D$=+53° ($CHCl_3$,c=2.03,24°C)

No.1m — 30

$CDCl_3$ 300MHz
1.04-2.21(14H,m),2.36(2H,t,J=7.3Hz),2.56(1H,m),,3.85(3H,s),3.88(1H,m),5. 27-5.46(2H,m),6.15(1H,d,J=7.2Hz),6.92(2H,d,J=8.6Hz),7.73(2H,d,J=8.6Hz)
IR($CHCl_3$):3440,3010,2950,2870,2645,1727,1710(sh),1646,1606,1575,1524,1 494/cm.
$[\alpha]_D$=+62° ($CHCl_3$,c=1.10,24°C).

No.1m — 31

$CDCl_3$+CD_3OD 300MHz
1.16-2.20(14H,m),2.31(2H,t,J=7.2Hz),2.59(1H,m),3.85(1H,m),5.31-5.51(2H, m),7.13-7.21(1H,m),7.31-7.42(2H,m),7.68-7.93(6H,m).
IR(Nujol):3344,3175,2715,2675,1699,1631,1566/cm.
$[\alpha]_D$=+67° (CH_3OH,c=1.01,24°C).

No.1m — 32

$CDCl_3$ 200MHz
1.09-2.23(14H,m),2.33(2H,t,J=7.1Hz),2.57(1H,brs),3.40-3.93(9H,m),4.41(1H, brs),5.29-5.48(2H,m),6.44(1H,d,J=7.4Hz),7.43(2H,d,J=8.2Hz),7.80(2H,d,J=7. 8Hz).
IR($CHCl_3$):3434,3354,1726,1720(sh),1660(sh),1626/cm.

No.1m — 33

$CDCl_3$ 200MHz
1.14-2.25(14H,m),2.37(2H,t,J=7.3Hz),2.64(1H,brs),3.93-4.01(1H,m),5.30-5.5 1(2H,m),6.47(1H,d,J=7.4Hz),7.63-7.74(2H,m),7.79(2H,s),7.89-7.93(1H,m),8. 00(1H,dd,J=2.3,1.0Hz),8.30(1H,d,J=1.0Hz),8.65-8.73(2H,m).
IR($CHCl_3$):3450,2675,1728,1707,1649,1528,1509/cm.
$[\alpha]_D$=+82.8±1.2° ($CHCl_3$,c=1.01,23°C).

No.2a-1

$[\alpha]_D$=+69.0° (MeOH,c=1.01,25°C)

No.2a-2

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.15 and 1.24(each 3H,each s),1.50-2.50(14H,m),4.3 0(1H,m),5.35-5.52(2H,m),6.32(1H,d,J=8.7Hz),7.36-7.49(3H,m),7.58-7.62(2H, m),7.66 and 7.80(each 2H,each d,J=8.7Hz).
IR($CHCl_3$):3116,3014,2925,2870,2663,1708,1651,1610,1524,1504,1484,1472 /cm.
$[\alpha]_D$= +64.1° (MeOH,c=1.02,25°C).

No.2a-3

$[\alpha]_D$=+76.6° (MeOH,c=1.18,26°C).

No.2a-4

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.15 and 1.25(each 3H,each s),1.64-2.51(14H,m),4.3 1(1H,m),5.36-5.53(2H,m),6.33(1H,d,J=8.4z),7.50-7.56(3H,m),7.85-7.98(6H, m).
IR($CHCl_3$):3515,3452,3014,2925,2870,1740,1708,1654,1517,1486,1470 /cm.
$[\alpha]_D$= +79.5° (MeOH,c=1.18, 22°C).

No.2a-5

CD_3OD 300MHz
0.98(1H,d,J=9.9Hz),1.18 and 1.25(each 3H,each s),1.56-1.71(3H,m),1.98-2. 40(11H,m),4.17(1H,m),5.41-5.52(2H,m),7.52-7.61(3H,m),7.91-8.01(6H,m).
IR(KBr):3416,3063,2983,2921,2869,1704,1643,1566,1518,1488,1408 /cm.
$[\alpha]_D$= +62.0° (MeOH,c=1.00, 25°C).

No.2a-6

$[\alpha]_D$=+64.1° (MeOH,c=1.01,25°C).

No.2a-7

$[\alpha]_D$=+65.3° (MeOH,c=0.99,25°C).

No.2a-8

$[\alpha]_D$=+74.0° (MeOH,c=1.01,25°C).

No.2a-9

$[\alpha]_D$=+71.0° (MeOH,c=1.10,25°C).

No.2a-10

$[\alpha]_D$=+74.7° (MeOH,c=1.00,25°C).

No.2a-11

$[\alpha]_D$=+72.1° (MeOH,c=1.00,25°C).

No.2a-12

$[\alpha]_D$=+53.1° ($CHCl_3$,c=1.01,26°C).
m.p.155.0-156.0°C

No.2a-13

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.18 and 1.25(each 3H,each s),1.63-2.40(14H,m),4.3 0(1H,m),5.46-5.58(2H,m),6.44(1H,d,J=8.4Hz),7.49 and 7.77(each 2H,each d,J=8.7Hz),7.54(1H,s).
IR($CHCl_3$):3689,3378,3028,3014,2924,1713,1652,1602,1522,1496 /cm.
$[\alpha]_D$= +78.3° (MeOH,c=0.84,25°C).
m.p.205.0-206.0°C

No.2a-14

$[\alpha]_D$=+72.5° (MeOH,c=1.07,25°C).

No.2a-15

$CDCl_3$ 300MHz
0.99(1H,d,J=9.9Hz),1.14 and 1.24(each 3H,each s),1.55-2.44(14H,m),4.27(1H,m),5.30-5.50(2H,m),6.29(1H,d,J=9.0Hz),7.11 and 7.20(each 1H,each d, J=16.2Hz),7.29-7.55(5H,m),7.57 and 7.72(each 2H,each d,J=8.7Hz).
IR($CHCl_3$):3453,3083,3022,3013,2925,2870,1708,1650,1607,1560,1522,1496 /cm.
$[\alpha]_D$= +72.3° (MeOH,c=1.00,27°C).
m.p.115.0-117.0°C

No.2a-16

$CDCl_3$ 300MHz
0.92(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.50-2.48(14H,m),3.6 2(3H,s),4.29(1H,m),5.30-5.50(2H,m),6.20(1H,d,J=8.7Hz),6.59 and 6.68 (each 1H,each,d,J=12.3Hz),7.23(5H,s),7.29 and 7.59(each 2H,each d,J=8. 1Hz).
IR($CHCl_3$):3453,3024,3016,2924,2870,1730,1651,1607,1520,1495 /cm.
$[\alpha]_D$= +56.8° (MeOH,c=1.04,24°C).

No.2a-17

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.50-2.38(14H,m),4.2 6(1H,m),5.30-5.50(2H,m),6.23(1H,d,J=8.4Hz),6.59 and 6.70(each 1H,each d,J=12.3Hz),7.23(5H,s),7.30 and 7.57(each 2H,each d,J=8.7Hz).
IR($CHCl_3$):3452,3081,3019,3014,2925,2870,2665,1708,1650,1607,1521,1495 /cm.
$[\alpha]_D$= +61.6° (MeOH,c=1.00,27°C).

No.2a-18

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each,s),1.50-2.50(14H,m),3.61 (3H,s),4.31(1H,m),5.35-5.51(2H,m),6.33(1H,d,J=8.4Hz),7.48-7.64(4H,m),7.7 9-7.83(2H,m),7.91(1H,dt,J=1.5 and 7.8Hz),8.01(1H,dt,J=1.5 and 7.8Hz),8. 13(1H,t,J=1.5Hz).
IR($CHCl_3$):3450,3026,3013,2925,2870,1730,1659,1600,1510 /cm.
$[\alpha]_D$= +56.0° (MeOH,c=1.01,25°C).

No.2a-19

$CDCl_3$ 300MHz
0.95(1H,d,J=9.9Hz),1.14 and 1.21(each 3H,each s),1.53-2.60(14H,m),4.25(1H,m),5.35-5.64(2H,m),7.21(1H,d,J=7.8Hz),7.49-7.68(4H,m),7.76-7.84(3H,m),8.25(1H,m),8.43(1H,m).
IR($CHCl_3$):3382,3196,3025,3015,2925,2870,1725,1652,1599,1577,1521 /cm.
$[\alpha]_D$= +55.9° (MeOH,c=1.00,25°C).

No.2a-20

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.13 and 1.24(each 3H,each s),1.50-2.50(14H,m),3.6 2(3H,s),4.31(1H,m),5.35-5.51(2H,m),6.24(1H,d,J=8.4Hz),7.40-7.52(3H,m),7. 71-7.76(2H,m).
IR($CHCl_3$):3453,3025,3013,2925,2870,1730,1753,1579,1514,1486 /cm.
$[\alpha]_D$= +61.2° (MeOH,c=1.04,25°C).

No.2a-21

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.13 and 1.23(each 3H,each s),1.52-2.50(14H,m),4.2 8(1H,m),5.34-5.51(2H,m),6.27(1H,d,J=8.7Hz),7.41-7.53(3H,m),7.71-7.74(2H, m).
IR($CHCl_3$):3452,3063,3027,3014,2925,2871,1708,1652,1578,1515,1486 /cm.
$[\alpha]_D$= +62.0° (MeOH,c=1.01,27°C).

No.2a-22

d_6-DMSO 300MHz
0.86(1H,d,J=9.9Hz),1.10 and 1.16(each 3H,each s),1.42-1.52(3H,m),1.85-2. 46(11H,m),3.98(1H,m),5.32-5.43(2H,m),7.41(3H,m),7.88(2H,d,J=6.6Hz),8.19 (1H,d,J=6.6Hz).
IR(KBr):3367,3060,2984,2922,2868,1634,1563,1529,1487/cm.
$[\alpha]_D$=+47.7° (MeOH,c=1.00,25°C).

No.2a-23

$[\alpha]_D$=+62.7° (MeOH,c=1.01,27°C).

No.2a-24

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.14 and 1.25(each 3H,each s),1.52-2.50(14H,m),4.3 1(1H,m),5.36-5.52(2H,m),6.34(1H,d,J=8.4Hz),7.47-7.52(2H,m),7.59-7.64(1H, m),7.78-7.83(6H,m).
IR($CHCl_3$):3449,3027,3013,2925,2869,1708,1656,1599,1518,1493 /cm.
$[\alpha]_D$= +63.1° (MeOH,c=1.00,25°C).

No.2a-25

$[\alpha]_D$=+35.1° (MeOH,c=1.00,25°C).

No.2a-26

$[\alpha]_D$=+35.5° (MeOH,c=1.02,25°C).

No.2a-27

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.12 and 1.23(each 3H,each s),1.52-2.50(14H,m),3.6 3(3H,s),4.29(1H,m),5.36-5.51(2H,m),6.18(1H,d,J=8.4Hz),7.01 and 7.71 (each 2H,each d,J=8.7Hz,),6.98-7.05(2H,m),7.16(1H,t,J=7.5Hz),7.34-7.41(2 H,m).
IR($CHCl_3$):3455,3024,3016,2924,2870,1730,1651,1588,1520,1487 /cm.
$[\alpha]_D$=+56.4° (MeOH,c=1.01,25°C).

No.2a-28

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.12 and 1.23(each 3H,each s),1.52-2.50(14H,m),4.2 6(1H,m),5.34-5.51(2H,m),6.20(1H,d,J=9.0Hz),7.01 and 7.70(each 2H,each d,J=9.0Hz,),6.98-7.15(2H,m),7.17(1H,t,J=7.5Hz),7.34-7.40(2H,m).
IR($CHCl_3$):3454,3031,3018,2925,2870,1708,1650,1588,1523,1487/cm.
$[\alpha]_D$= +56.2° (MeOH,c=1.00,25°C).

No.2a-29

$[\alpha]_D$=+53.0° (MeOH,c=1.03,25°C).

No.2a-30

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.10 and 1.23(each 3H,each s),1.52-2.50(14H,m),4.2 5(1H,m),5.30-5.50(2H,m),6.23(1H,d,J=8.7Hz),6.36(1H,s),7.26-7.39(10H,m),7. 60 and 7.68(each 2H,each d,J=8.4Hz,).
IR($CHCl_3$):3451,3088,3064,3029,3014,2925,2869,1707,1652,1522,1495 /cm.
$[\alpha]_D$=+54.2° (MeOH,c=1.00,25°C).

No.2a-31

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.14 and 1.24(each 3H,each s),1.50-2.50(14H,m),3.6 3(3H,s),4.31(1H,m),5.30-5.50(2H,m),6.26(1H,d,J=8.4Hz),6.90(1H,t,J=7.4Hz), 7.13(1H,d,J=8.7Hz),7.29(2H,t,J=8.0Hz),7.67-7.75(5H,m),7.82(1H,s).
IR(Nujol):3380,3244,1723,1638,1601,1578,1535,1495 /cm.
$[\alpha]_D$=+73.6° (MeOH,c=0.50,26°C).
m.p.133.0-134.0°C

No.2a-32

$[\alpha]_D$=+56.1° (MeOH,c=1.02,26°C).

No.2a-33

$CDCl_3$ 300MHz
0.95(1H,d,J=10.2Hz),1.10 and 1.21(each,3H,each s),1.50-2.50(14H,m),4.25 (1H,m),5.13(2H,s),5.30-5.70(3H,m),6.41(1H,d,J=8.2Hz),6.89(1H,s),7.09(1H, s),7.17 and 7.72(each 2H,each d,J=8.2Hz),7.62(1H,s).
IR($CHCl_3$):3450,3125,3031,3013,2925,2870,2467,1917,1708,1654,1615,1575, 1523,1497 /cm.
$[\alpha]_D$=+55.2° (MeOH,c=1.01,26°C).

No.2a-34

$[\alpha]_D$=+72.9° (MeOH,c=1.03,25°C).

No.2a-35

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.13 and 1.24(each 3H,each s),1.52-2.48(14H,m),4.2 8(1H,m),5.35-5.51(2H,m),6.28(1H,d,J=8.7Hz),7.34-7.37(3H,m),7.52-7.55(2H, m),7.58 and 7.71(each 2H,each d,J=8.7Hz).
IR($CHCl_3$):3515,3452,3030,3012,2925,2870,1739,1708,1652,1607,1555,1521, 1497 /cm.
$[\alpha]_D$=+74.3° (MeOH,c=1.01,25°C).

No.2a-36

$[\alpha]_D$=+23.4° (MeOH,c=1.07,25°C).

No.2a-37

$CDCl_3$ 300MHz
0.83(1H,d,J=10.5Hz),0.95 and 1.18(each 3H,each s),1.44-2.46(14H,m),3.9 2(1H,m),5.34-5.52(3H,m),7.26-7.54(9H,m),7.62(1H,s).
IR($CHCl_3$):3432,3310,3189,3023,3014,2924,2870,1704,1610,1594,1523,1487 /cm.
$[\alpha]_D$=+25.3° (MeOH,c=1.00,26°C).

No.2a-38

$[\alpha]_D$=+70.9° (MeOH,c=1.02,25°C).

No.2a-39

$[\alpha]_D$=+70.6° (MeOH,c=1.01,25°C).

No.2a-40

$[\alpha]_D$=+74.7° (MeOH,c=1.00,25°C).

No.2a-41

$[\alpha]_D$=+72.1° (MeOH,c=1.01,24°C).

No.2a-42

$[\alpha]_D$=+69.2° (MeOH,c=1.00,25°C).

No.2a-43

$[\alpha]_D$=+70.8° (MeOH,c=1.00,25°C).

No.2a-44

$[\alpha]_D$=+60.4° (MeOH,c=1.00,26°C).

No.2a-45

$CDCl_3$ 300MHz
0.97(1H,d,J=9.9Hz),1.13 and 1.23(each 3H,each s),1.55-2.52(14H,m),4.29(1H,m),5.34-5.54(2H,m),6.33(1H,d,J=9.0Hz),7.10(1H,t,J=7.4Hz),7.34(2H,t,J =7.4Hz),7.52(2H,m),7.68 and 7.75(each 2H,each d,J=8.4Hz),7.80(1H,s),8. 10(1H,s),10.09(1H,s).
IR($CHCl_3$):3393,3195,3093,3033,3013,2925,2870,1698,1656,1598,1537,1498 /cm.
$[\alpha]_D$=+59.4° (MeOH,c=1.01,24°C).

No.2a-46

$[\alpha]_D$=+63.5° (MeOH,c=1.00,25°C).

No.2a-47

$CDCl_3$ 300MHz
0.97(1H,d,J=9.9Hz),1.12 and 1.23(each 3H,each s),1.54-2.48(14H,m),4.29(1H,m),5.35-5.52(2H,m),6.32(1H,d,J=8.7Hz),7.26(1H,m),7.41(2H,t,J=7.8Hz), 7.64(2H,d,J=7.5Hz),7.73 and 7.77(each 2H,each d,J=8.4Hz),7.95(1H,s),9. 20(1H,s),10.38(1H,s).
IR($CHCl_3$):3450,3339,3003,2992,2925,2870,1706,1653,1596,1523,1495/cm.
$[\alpha]_D$=+63.3° (MeOH,c=1.00,25°C).

No.2a-48

$[\alpha]_D$=+63.8° (MeOH,c=1.00,24°C).

No.2a-49

$CDCl_3$ 300MHz
1.00(1H,d,J=10.5Hz),1.17 and 1.26(each 3H,each s),1.55-2.52(14H,m),4.3 4(1H,m),5.36-5.54(2H,m),6.35(1H,d,J=9.0Hz),7.50-7.62(3H,m),7.90 and 8.3 3(each 2H,each d,J=8.4Hz),8.21(2H,m).
IR($CHCl_3$):3451,3029,3022,3016,2925,2870,1708,1655,1542,1508,1498,1471, 1459 /cm.
$[\alpha]_D$=+63.5° (MeOH,c=1.02,25°C):
m.p.135.0-137.0°C

No.2a-50

$[\alpha]_D$=+68.9° (MeOH,c=1.01,24°C).

No.2a-51

d_6-DMSO 300MHz
0.87(1H,d,J=9.9Hz),1.10 and 1.17(each 3H,each s),1.40-1.60(3H,m),1.90-2. 40(11H,m),3.98(1H,m),5.35-5.46(2H,m),7.64(1H,s),7.65 and 7.91(each 2H, each d,J=8.7Hz),8.06(1H,d,J=6.0Hz),9.32(1H,brs).
IR(KBr):3385,2962,1734,1707,1632,1529,1498 /cm.
$[\alpha]_D$=+68.4° (MeOH,c=1.01,24°C).

No.2a-52

$[\alpha]_D$=+76.2° (MeOH,c=1.01,24°C).

No.2a-53

$[\alpha]_D$=+73.9° (MeOH,c=1.02,24°C).

No.2a-54

$[\alpha]_D$=+68.1° (MeOH,c=1.00,24°C).

No.2a-55

$[\alpha]_D$=+67.8° (MeOH,c=1.00,24°C).

No.2a-56

$[\alpha]_D$=+65.4° (MeOH,c=1.03,25°C).

No.2a-57

$[\alpha]_D$=+63.4° (MeOH,c=1.01,24°C).

No.2a-58

$[\alpha]_D$=+66.6° (MeOH,c=1.01,24°C).

No.2a-59

$[\alpha]_D$=+65.5° (MeOH,c=1.00,24°C).

No.2a-60

$[\alpha]_D$=+60.9° (MeOH,c=1.02,25°C).

No.2a-61

$CDCl_3$ 300MHz
0.97(1H,d,J=10.0Hz),1.10 and 1.22(each 3H,each s),1.50-2.50(14H,m),4.2 6(1H,m),5.30-5.54(2H,m),6.28(1H,d,J=8.6Hz),6.60 and 6.82(each 1H,each d,J=12.4Hz,),7.12(2H,d,J=6.0Hz),7.25 and 7.62(each 2H,each d,J=8.6Hz),8.47(2H,d,J=6.0Hz).
IR($CHCl_3$):3452,3027,3019,3013,2925,2870,2480,1708,1651,1606,1520,1494 /cm.
$[\alpha]_D$=+61.6° (MeOH,c=1.01,25°C).

No.2a-62

$[\alpha]_D$=+72.0° (MeOH,c=0.93,25°C).

No.2a-63

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.14 and 1.24(each 3H,each s),1.50-2.50(14H,m),4.2 9(1H,m),5.36-5.55(2H,m),6.35(1H,d,J=9.1Hz),7.04 and 7.27(each 1H,each d,J=16.5Hz),7.37(2H,d,J=6.6Hz),7.56 and 7.76(each 2H,each d,J=8.4Hz), 8.57(2H,d,J=6.6Hz).
IR($CHCl_3$):3452,3024,3018,3014,2925,2870,2470,1933,1708,1652,1605,1521, 1496 /cm.
$[\alpha]_D$=+69.2° (MeOH,c=1.01,25°C).

No.2a-64

$[\alpha]_D$=+56.9° (MeOH,c=1.24,25°C).

No.2a-65

$CDCl_3$ 300MHz
0.98(1H,d,J=10.5Hz),1.12 and 1.23(each 3H,each s),1.54-2.46(14H,m),4.2 7(1H,m),5.23(2H,s),5.34-5.52(2H,m),6.26(1H,d,J=8.4Hz),7.32-7.45(5H,m),7. 64 and 7.71 (each 2H,each d,J=8.4Hz),8.15(1H,s).
IR($CHCl_3$):3452,3088,3065,3032,3013,2925,2870,1708,1653,1611,1559,1522, 1496 /cm.
$[\alpha]_D$=+61.0° (MeOH,c=0.91,25°C).

No.2a-66

$[\alpha]_D$=+76.0° (MeOH,c=1.01,25°C).

No.2a-67

$CDCl_3$ 300MHz
0.98(1H,d,J=10.4Hz),1.14 and 1.24(each 3H,each s),1.54-2.46(14H,m),4.2 8(1H,m),5.32-5.53(2H,m),6.27(1H,d,J=8.6Hz),6,92-7.31(each 1H,each d,J= 16.4Hz),7.02(1H,dd,J=5.8 and 3.6Hz),7.12(1H,d,J=3.6Hz),7.24(1H,d,J=5.8 Hz),7.51 and 7.70(each 2H,each d,J=8.4Hz).
IR($CHCl_3$):3453,3029,3013,2925,2870,1739,1650,1604,1524,1515,1494 /cm.
$[\alpha]_D$=+76.2° (MeOH,c=1.00,24°C).
m.p.104.0-106.0°C

No.2a-68

$[\alpha]_D$=+57.7° (MeOH,c=1.01,25°C).

No.2a-69

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.14 and 1.24(each 3H,each s),1.54-2.48(14H,m),4.2 8(1H,m),5.34-5.53(2H,m),6.29(1H,d,J=9.0Hz),6,54-6.74(each 1H,each d,J= 12.0Hz),7.02(1H,dd,J=4.8 and 3.3Hz),6.97(1H,dd,J=3.3 and 1.2Hz),7.13(1 H,dd,J=4.8 and 1.2Hz),7.44 and 7.70(each 2H,each d,J=8.7Hz).
IR($CHCl_3$):3453,3025,3010,2925,2870,1708,1650,1607,1559,1523,1493 /cm.
$[\alpha]_D$=+58.4° (MeOH,c=1.00,25°C).

No.2a-70

$[\alpha]_D$=+48.6° (MeOH,c= 1.00,25°C).

No.2a-71

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.12 and 1.23(each 3H,each s),1.52-2.46(14H,m),2.3 1(3H,s),4.26(1H,m),5.33-5.52(2H,m),6.20(1H,d,J=9.3Hz),7.02-7.11(6H,m),7. 70(2H,d,J=9.0Hz).
IR($CHCl_3$):3460,3031,3022,3011,2925,2870,1750,1708,1650,1608,1597,1523, 1490 /cm.
$[\alpha]_D$=+48.9° (MeOH,c=1.01,25°C).

No.2a-72

$[\alpha]_D$=+51.2° (MeOH,c=1.02,25°C).

No.2a-73

$CDCl_3$ 300MHz
0.97(1H,d,J=9.9Hz), 1.11 and 1.23(each 3H,each s), 1.54-2.48(14H,m),4.27(1H,m),5.32-5.52(2H,m),6.24(1H,d,J=9.0Hz),6.83-6.94(6H,m),7.65(2H,d,J=9. 0Hz).
IR($CHCl_3$):3598,3451,3199,3033,3012,2925,2870,1708,1642,1604,1524,1507, 1491 /cm.
$[\alpha]_D$=+52.2° (MeOH,c=1.01,25°C).

No.2a-74

$[\alpha]_D$=+51.5° (MeOH,c=0.92,25°C).

No.2a-75

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.55-2.46(14H,m),3.8 2(3H,s),4.25(1H,m),5.32-5.52(2H,m),6.19(1H,d,J=8.7Hz),6.89-7.01(6H,m),7. 65-7.68(2H,m).
IR($CHCl_3$):3450,3025,3008,2925,2870,2837,1741,1649,1612,1521,1505,1490 /cm.
$[\alpha]_D$=+51.1° (MeOH,c=1.00,25°C).

No.2a-76

$[\alpha]_D$=+60.4° (MeOH,c=0.98,25°C).

No.2a-77

$CDCl_3$ 300MHz
0.99(1H,d,J=10.5Hz),1.15 and 1.24(each 3H,each s),1.54-2.48(14H,m),2.3 4(3H,s),4.29(1H,m),5.32-5.54(2H,m),6.32(1H,d,J=8.4Hz),7.19 and 7.60 (each 2H,each d,J=8.4Hz),7.63 and 7.79(each 2H,each d,J=8.4Hz).
IR($CHCl_3$):3452,3027,3012,2925,2870,1751,1709,1651,1611,1560,1527,1509, 1489 /cm.
$[\alpha]_D$=+61.2° (MeOH,c=1.00,25°C).

No.2a-78

$[\alpha]_D$=+67.4° (MeOH,c=1.01,25°C).

No.2a-79

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.15 and 1.24(each 3H,each s),1.54-2.54(14H,m),4.3 1(1H,m),5.32-5.54(2H,m),6.36(1H,d,J=8.2Hz),6.93 and 7.48(each 2H,each d,J=8.6Hz),7.59 and 7.75(each 2H,each d,J=8.4Hz).
IR($CHCl_3$):3593,3448,3192,3030,3010,2925,2870,1708,1644,1608,1591,1559, 1530,1516,1491 /cm.
$[\alpha]_D$=+65.8° (MeOH,c=1.01,25°C).

No.2a-80

$[\alpha]_D$=+66.9° (MeOH,c=1.01,25°C).

No.2a-81

$CDCl_3$ 300MHz
0.99(1H,d,J=10.5Hz),1.15 and 1.24(each 3H,each s),1.54-2.48(14H,m),3.8 6(3H,s),4.29(1H,m),5.34-5.52(2H,m),6.20(1H,d,J=8.7Hz),6.99 and 7.55 (each 2H,each d,J=9.0Hz),7.61 and 7.77(each 2H,each d,J=8.7Hz).
IR($CHCl_3$):3450,3009,2925,2870,2838,1740,1708,1650,1608,1557,1528,1512, 1491 /cm.
$[\alpha]_D$=+66.2° (MeOH,c=1.01,25°C).

No.2a-82

$[\alpha]_D$=+57.7° (MeOH,c=1.02,24°C).

No.2a-83

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.12 and 1.23(each 3H,each s),1.54-2.48(14H,m),2.3 3(3H,s),4.26(1H,m),5.32-5.52(2H,m),6.25(1H,d,J=8.7Hz),7.16 and 7.75 (each 2H,each d,J=8.7Hz).
IR($CHCl_3$):3452,3030,3022,3012,2925,2870,1754,1709,1654,1604,1585,1522, 1493 /cm.
$[\alpha]_D$=+57.4° (MeOH,c=1.01,24°C).

No.2a-84

$[\alpha]_D$=+57.8° (MeOH,c=1.01,24°C).

No.2a-85

$CDCl_3$ 300MHz
0.95(1H,d,J=10.2Hz),1.12 and 1.22(each 3H,each s),1.54-2.48(14H,m),4.2 5(1H,m),5.32-5.52(2H,m),6.28(1H,d,J=8.7Hz),6.87 and 7.57(each 2H,each d,J=9.0Hz).
IR($CHCl_3$):3590,3450,3166,3019,3012,2925,2871,1708,1637,1608,1583,1531, 1498 /cm.
$[\alpha]_D$=+56.0° (MeOH,c=1.01,24°C).

No.2a-86

$[\alpha]_D$=+59.3° (MeOH,c=1.01,22°C).

No.2a-87

$CDCl_3$ 300MHz
0.98(1H,d,J=10.0Hz),1.13 and 1.23(each 3H,each s),1.54-2.48(14H,m),3.8 5(3H,s),4.25(1H,m),5.32-5.53(2H,m),6.19(1H,d,J=8.8Hz),6.93 and 7.69 (each 2H,each d,J=9.0Hz).
IR($CHCl_3$):3450,3030,3017,3012,2925,2870,2840,1740,1708,1647,1606,1575, 1525,1496 /cm.
$[\alpha]_D$=+58.2° (MeOH,c=0.99,22°C).

No.2a-88

$[\alpha]_D$=+50.9° (MeOH,c=1.02,25°C).

No.2a-89

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.18 and 1.26(each 3H,each s),1.56-2.48(14H,m),4.2 9(1H,m),5.36-5.54(2H,m),7.03(1H,d,J=8.7Hz),7.21(1H,s),7.43(2H,m),7.74(1 H,ddd,J=1.8,6.9 and 8.7Hz),8.22(1H,dd,J=1.8 and

8.1Hz).
IR($CHCl_3$):3443,3087,3023,3014,2925,2870,1708,1685,1658,1630,1517,1466 /cm.
$[\alpha]_D$=+57.1° (MeOH,c=1.01,22°C).
m.p.117.0-118.0°C

No.2a-90

$[\alpha]_D$=+54.1° (MeOH,c=1.01,22°C).

No.2a-91

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.13 and 1.23(each 3H,each s),1.52-2.46(14H,m),4.2 4(1H,m),5.34-5.52(2H,m),6.49-6.53(2H,m),7.11(1H,dd,J=0.9 and 3.6Hz),7.4 4(1H,dd,J=0.9 and 1.8Hz).
IR($CHCl_3$):3437,3033,3022,3014,2925,2870,1739,1708,1655,1595,1520,1472 /cm.
$[\alpha]_D$=+55.0° (MeOH,c=1.00,22°C).

No.2a-92

$[\alpha]_D$=+50.3° (MeOH,c=1.00,22°C).

No.2a-93

$CDCl_3$ 300MHz
0.95(1H,d,J=10.5Hz),1.12 and 1.23(each 3H,each s),1.52-2.46(14H,m),4.2 5(1H,m),5.34-5.52(2H,m),6.12(1H,d,J=8.7Hz),7.07(1H,dd,J=3.9 and 5.1Hz), 7.45-7.48(2H,m).
IR($CHCl_3$):3450,3023,3011,2925,2870,1739,1708,1645,1531,1501,1471 /cm.
$[\alpha]_D$=+49.1° (MeOH,c=1.02,24°C).

No.2a-94

$[\alpha]_D$=+51.5° (MeOH,c=1.00,24°C).

No.2a-95

$CDCl_3$ 300MHz
0.96(1H,d,J=10.5Hz),1.11 and 1.23(each 3H,each s),1.52-2.46(14H,m),4.2 5(1H,m),5.34-5.56(2H,m),6.14(1H,d,J=8.7Hz),7.34(2H,d,J=2.0Hz),7.85(1H,t, J=2.0Hz).
IR($CHCl_3$):3452,3114,3030,3013,2925,2870,1708,1649,1535,1498,1471/cm.
$[\alpha]_D$=+55.5° (MeOH,c=1.00,25°C).
m.p.87.0-88.0°C

No.2a-96

CD_3OD 300MHz
0.94(1H,d,J=10.2Hz),1.13 and 1.22(each 3H,each s),1.50-1.76(3H,m),1.94-2.39(11H,m),4.11(1H,m),5.39-5.49(2H,m),7.43-7.51(2H,m),8.05(1H,m).
IR(KBr):3369,3084,2985,2921,2868,1630,1566,1538,1503 /cm.
$[\alpha]_D$=+38.8° (MeOH,c=1.01,22°C).

No.2a-97

CD_3OD 300MHz
0.93(1H,d,J=9.9Hz),1.13 and 1.22(each 3H,each s),1.48-1.58(3H,m),1.96-2. 36(11H,m),4.10(1H,m),5.35-5.50(2H,m),7.42-7.51(2H,m),8.06(1H,m).
IR(KBr):3447,3087,2987,2922,2868,1629,1545,1501 /cm.
$[\alpha]_D$=+52.9° (MeOH,c=1.01,24°C).

No.2a-98

$[\alpha]_D$=+53.2° (MeOH,c=1.02,23°C).

No.2a-99

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.12 and 1.22(each 3H,each s),1.26-2.45(24H,m),4.2 5(2H,m),5.34-5.52(2H,m),6.18(1H,d,J=8.7Hz),6.91 and 7.66(each 2H,each d,J=9.0Hz).
IR($CHCl_3$):3455,3029,3019,2939,2862,1738,1709,1645,1605,1523,1494 /cm.
$[\alpha]_D$=+51.4° (MeOH,c=1.00,23°C).

No.2a-100

$[\alpha]_D$=+49.3° (MeOH,c=1.00,24°C).

No.2a-101

$[\alpha]_D$=+51.3° (MeOH,c=1.00,24°C).

No.2a-102

$[\alpha]_D$=+48.8° (MeOH,c=1.01,23°C).

No.2a-103

$CDCl_3$ 300MHz
0.94(1H,d,J=10.2Hz),1.12 and 1.22(each 3H,each s),1.52-2.46(14H,m),2.4 8(3H,d,J=0.3Hz),4.20(1H,m),5.32-5.54(2H,m),6.46(1H,brs),7.12(1H,d,J=9.0 Hz).
IR($CHCl_3$):3415,3144,3029,3011,2926,2871,1708,1671,1598,1538,14564 /cm
$[\alpha]_D$=+49.6° (MeOH,c=1.01,23°C).

No.2a-104

$[\alpha]_D$=+77.0° (MeOH,c=1.02,23°C).

No.2a-105

$CDCl_3$ 300MHz
93(1H,d,J=9.9Hz),1.09 and 1.21(each 3H,each s),1.51-2.44(14H,m),3.90(6 H,s),4.20(1H,m),5.38-5.50(2H,m),5.87(1H,d,J=9.0Hz),6.25 and 7.54 (each 1H,each d,J=15.6Hz),6.84(1H,d,J=8.1Hz),7.03(1H,d,J=1.8Hz),7.09(1 H,dd,J=1.8 and 8.1Hz).
IR($CHCl_3$):3439,3028,3012,2937,2871,2841,1739,1708,1661,1620,1600,1513 /cm.
$[\alpha]_D$=+77.3° (MeOH,c=1.01,23°C).

No.2a-106

$[\alpha]_D$=+67.0° (MeOH,c=1.00,25°C).

No.2a-107

$[\alpha]_D$=+66.6° (MeOH,c=1.01,24°C).
m.p.168.0-170.0°C

No.2a-108

$[\alpha]_D$=+61.8° (MeOH,c=1.00,22°C).

No.2a-109

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.10 and 1.22(each 3H,each s),1.51-2.45(14H,m),4.2 5(1H,m),5.33-5.49(2H,m),6.21(1H,d,J=8.7Hz),7.25 and 7.60(each 2H,each d,J=8.7Hz),7.33-7.41(5H,s).
IR($CHCl_3$):3453,3062,3028,3014,2925,2870,1739,1708,1651,1594,1557,1515, 1481 /cm.
$[\alpha]_D$=+61.0° (MeOH,c=1.01,22°C).

No.2a-110

CD_3OD 300MHz

0.94(1H,d,J=9.9Hz),1.13 and 1.22(each 3H,each s),1.54-2.37(14H,m),4.12(1H,m),5.38-5.49(2H,m),7.25 and 7.68(each 2H,each d,J=8.7Hz),7.41(5H,s)

IR(KBr):3435,3058,2986,2920,2866,1635,1595,1562,1521,1482,1439,1411 /cm.

$[\alpha]_D$=+47.3° (MeOH,c=1.01,23°C).

No.2a-111

$[\alpha]_D$=+65.6° (MeOH,c=1.01,24°C).

No.2a-112

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.12 and 1.23(each 3H,each s),1.51-2.46(14H,m),4.2 7(1H,m),5.35-5.50(2H,m),6.22(1H,d,J=8.4Hz),7.40 and 7.66(each 2H,each d,J=9.0Hz).
IR($CHCl_3$):3439,3028,3012,2937,2871,2841,1739,1708,1661,1620,1600,1513 /cm.
$[\alpha]_D$=+65.6° (MeOH,c=1.01,22°C).

No.2a-113

$[\alpha]_D$=+59.6° (MeOH,c=1.00,24°C).

No.2a-114

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.12 and 1.24(each 3H,each s),1.52-2.46(14H,m),4.2 9(1H,m),5.35-5.51(2H,m),6.28(1H,d,J=8.4Hz),7.70 and 7.83(each 2H,each d,J=8.4Hz).
IR($CHCl_3$):3439,3028,3012,2937,2871,2841,1739,1708,1661,1620,1600,1513 /cm.
$[\alpha]_D$=+60.6° (MeOH,c=1.01,22°C).

No.2a-115

$[\alpha]_D$=+59.7° (MeOH,c=0.99,24°C).

No.2a-116

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.12 and 1.23(each 3H,each s),1.52-2.46(14H,m),2.3 9(3H,s),4.27(1H,m),5.33-5.51(2H,m),6.24(1H,d,J=9.0Hz),7.23 and 7.62 (each 2H,each d,J=8.4Hz).
IR($CHCl_3$):3439,3028,3012,2937,2871,2841,1739,1708,1661,1620,1600,1513/cm.
$[\alpha]_D$=+59.7° (MeOH,c=0.99,24°C).

No.2a-117

$[\alpha]_D$=+56.7° (MeOH,c=1.00,23°C).

No.2a-118

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.53-2.44(14H,m),4.2 3(1H,m),5.34-5.51(2H,m),6.02(2H,s),6.13(1H,d,J=8.7Hz),6.83(1H,dd,J=1.2 and 7.8Hz),7.22-7.25(2H,m).
IR($CHCl_3$):3453,3031,3020,3012,2924,2870,1740,1708,1650,1619,1605,1519, 1504,1480 /cm.
$[\alpha]_D$=+57.2° (MeOH,c=1.02,23°C).

No.2a-119

$CDCl_3$ 300MHz
0.96(1H,d,J=10.5Hz),1.07 and 1.23(each 3H,each s),1.51-2.44(14H,m),2.3 2(3H,s),4.26(1H,m),5.37-5.52(2H,m),6.40(1H,d,J=9.0Hz),7.09(1H,m),7.30(1 H,m),7.46(1H,m),7.66(1H,m).
IR($CHCl_3$):3443,3028,3012,2925,2870,1766,1747,1709,1657,1607,1516,1479 /cm.
$[\alpha]_D$=+53.2° (MeOH,c=0.99,21°C).

No.2a-120

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.14 and 1.24(each 3H,each s),1.53-2.44(14H,m),4.3 0(1H,m),5.35-5.52(2H,m),6.42(1H,d,J=8.7Hz),6.85(1H,m),6.99(1H,dd,J=1.2 and 8.4Hz),7.27(1H,m),7.39(1H,m).
IR($CHCl_3$):3463,3033,3021,3014,2992,2924,2870,1708,1643,1597,1523,1488 /cm.
$[\alpha]_D$=+46.3° (MeOH,c=1.01,21°C).

No.2a-121

$CDCl_3$ 300MHz
0.98(1H,d,J=10.2Hz),1.14 and 1.23(each 3H,each s),1.47-2.47(14H,m),3.9 5(3H,s),4.31(1H,m),5.32-5.50(2H,m),6.98(1H,dd,J=0.9 and 8.4Hz),7.09(1H, ddd,J=0.9,7.7 and 8.4Hz),7.45(1H,m),8.19(1H,dd,J=2.1 and 8.1Hz),8.32(1 H,d,J=9.0Hz).
IR($CHCl_3$):3400,3078,3028,3020,3007,2924,2870,2842,1736,1708,1640,1600, 1536,1483,1470 /cm.
$[\alpha]_D$=+38.1° (MeOH,c=1.02,23°C).

No.2a-122

$[\alpha]_D$=+42.3° (MeOH,c=0.99,23°C).

No.2a-123

$[\alpha]_D$=+38.7° (MeOH,c=1.00,21°C).

No.2a-124

$[\alpha]_D$=+45.0° (MeOH,c=1.01,21°C).
m.p.119.0-120.0°C

No.2a-125

$[\alpha]_D$=+49.8° (MeOH,c=1.01,22°C).

No.2a-126

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.52-2.47(14H,m),4.2 6(1H,m),5.34-5.50(2H,m),6.22(1H,d,J=8.7Hz),7.55-7.61(4H,m).
IR($CHCl_3$):3400,3078,3028,3020,3007,2924,2870,2842,1736,1708,1640,1600, 1536,1483,1470 /cm.
$[\alpha]_D$=+63.0° (MeOH,c=1.01,23°C).

No.2a-127

$CDCl_3$ 300MHz
0.91(1H,d,J=10.2Hz),1.10 and 1.20(each 3H,each s),1.50-2.42(14H,m),4.2 3(1H,m),5.31-5.51(2H,m),6.45(1H,d,J=8.4HZ),7.01(1H,t,J=7.4Hz),7.22-7.27(2H,m),7.33-7.40(4H,m),7.53(2H,d,J=9.0Hz),8.30 and 8.48(each 1H,each s)
IR($CHCl_3$):3452,3028,3022,3015,2925,2870,1708,1654,1590,1514,1478 /cm.
$[\alpha]_D$=+59.5° (MeOH,c=1.01,23°C).

No.2a-128

d_6-DMSO 300MHz
0.84(1H,d,J=9.9Hz),1.06 and 1.19(each 3H,each s),1.37-2.37(14H,m),3.79(1H,m),5.35-5.51(2H,m),6.08(1H,d,J=8.7Hz),6.85-6.90(1H,m),7.18-7.23(2H,m),7.35-7.38(2H,m),8.42(1H,s),12.00(1H,s).
IR(Nujol):3395,3345,2925,2866,2623,2506,1697,1658,1638,1597,1557 /cm.
$[\alpha]_D$=+26.0° (MeOH,c=1.01,23°C).
m.p.164.0-166.0°C

No.2a-129

$CDCl_3$ 300MHz
1.01(1H,d,J=10.0Hz),1.17 and 1.25(each 3H,each s),1.54-2.52(14H,m),4.3 4(1H,m),5.36-5.57(2H,m),6.42(1H,d,J=8.6Hz),7.51-7.60(2H,m)7.77(1H,dd,J =1.8 and 8.6Hz),7.85-7.96(3H,m),8.24(1H,brs).
IR($CHCl_3$):3451,3060,3028,3010,2925,2870,1708,1652,1629,1600,1517,1502 /cm.
$[\alpha]_D$=+68.6° (MeOH,c=1.00,22°C).

No.2a-130

$CDCl_3$ 300MHz
1.02(1H,d,J=10.2Hz),1.04 and 1.26(each 3H,each s),1.54-2.52(14H,m),4.4 1(1H,m),5.41-5.58(2H,m),6.14(1H,d,J=9.0Hz),7.43-7.59(4H,m),7.85-7.92(2H, m),8.27(1H,dd,J=1.8 and 7.2Hz).
IR($CHCl_3$):3436,3032,3010,2924,2870,2664,1708,1652,1512,1498 /cm.
$[\alpha]_D$=+93.9° (MeOH,c=1.00,22°C)
m.p.94.0-96.0°C

No.2a-131

$[\alpha]_D$=+50.2° (MeOH,c=0.95,21°C).

No.2a-132

$[\alpha]_D$=+10.9° (MeOH,c=0.92,21°C).

No.2a-133

$[\alpha]_D$=+60.4° (MeOH,c=1.00,21°C).

No.2a-134

$[\alpha]_D$=+38.5° (MeOH,c=1.01,23°C).

No.2a-135

$[\alpha]_D$=+52.5° (MeOH,c=1.01,23°C).
m.p.180.0-182.0°C

No.2a-136

$[\alpha]_D$=+35.3° (MeOH,c=1.02,23°C).
m.p.79.0-80.0°C

No.2a-137

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.22(each 3H,each s),1.43(3H,t,J=6.9Hz),1. 52-2.44(14H,m),4.03(2H,q,J=6.9Hz),4.26(1H,m),5.33-5.50(2H,m),6.19(1H,d, J=8.7Hz),6.88-7.00(6H,m),7.65-7.68(2H,m).
IR($CHCl_3$):3455,3031,3024,3014,2988,2925,2870,1741,1708,1649,1602,1521, 1504,1490 /cm.
$[\alpha]_D$=+52.0° (MeOH,c=1.01,23°C).

No.2a-138

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.22(each 3H,each s),1.35(6H,d,J=6.0Hz),1. 53-2.46(14H,m),4.25(1H,m),4.51(1H,m),5.33-5.50(2H,m),6.12(1H,d,J=9.0Hz),6.87-6.99(6H,m),7.65-7.68(2H,m).
IR($CHCl_3$):3454,3031,3014,2980,2925,2870,1741,1708,1649,1602,1522,1490 /cm.
$[\alpha]_D$=+50.0° (MeOH,c=1.05,22°C).

No.2a-139

$CDCl_3$ 300MHz
1.00(1H,d,J=10.2Hz),1.16 and 1.24(each 3H,each s),1.59-2.52(14H,m),4.3 1(1H,m),5.40-5.53(2H,m),6.36(1H,d,J=8.7Hz),6.70(1H,d,J=1.5Hz),7.12(1H, m),7.30(1H,m),7.47(1H,dd,J=0.6 and 8.1Hz),7.61(1H,d,J=8.4Hz).
IR($CHCl_3$):3449,3243,3029,3022,3013,2925,2871,1707,1631,1542,1505 /cm.
$[\alpha]_D$=+63.4° (MeOH,c=1.00,23°C).
m.p.178.0-179.0°C

No.2a-140

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.18 and 1.23(each 3H,each s),1.57-2.50(14H,m),4.3 5(1H,m),5.32-5.55(2H,m),6.42(1H,d,J=8.7Hz),6.70(1H,d,J=1.5Hz),7.21-7.24(2H m),7.46(1H,m),7.76(1H,m),7.86(1H,d,J=3.0Hz),10.20(1H,s).
IR($CHCl_3$):3465,3010,2924,1739,1604,1546,1504 /cm.
$[\alpha]_D$=+39.4° (MeOH,c=1.01,22°C).
m.p.167.0-168.0°C

No.2a-141

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.14 and 1.24(each 3H,each s),1.55-2.44(14H,m),3.8 4(3H,s),4.27(1H,m),5.34-5.52(2H,m),6.28(1H,d,J=9.0Hz),6.91 and 7.47 (each 2H,each d,J=9.0Hz),6.98 and 7.14(each 1H,each d,J=16.5Hz),7.54 and 7.70(each 2H,eachd,J=8.7Hz).
IR($CHCl_3$):3453,3025,3015,2925,2870,2839,1740,1708,1649,1602,1510,1493, 1470 /cm.
$[\alpha]_D$=+73.4° (MeOH,c=1.02,22°C).
m.p.155.0-157.0°C

No.2a-142

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.52-2.45(14H,m),3.7 9(3H,s),4.27(1H,m),5.34-5.50(2H,m),6.24(1H,d,J=9.0Hz),6.49 and 6.62 (each 1H each d,J=12.3Hz),6.77 and 7.16(each 2H,each d,J=8.7Hz),7.32 and 7.59(each 2H,eachd,J=8.1Hz).

IR($CHCl_3$):3453,3025,3014,2925,2870,2839,1739,1708,1649,1606,1510, 1494 /cm.
$[\alpha]_D$=+60.7° (MeOH,c=0.99,22°C).

No.2a-143

$[\alpha]_D$=+57.3° (MeOH,c=1.01,23°C).

No.2a-144

$[\alpha]_D$=+12.2° (MeOH,c=1.00,23°C).
m.p.114.0-116.0°C

No.2a-145

$CDCl_3$ 300MHz
0.95(1H,d,J=10.2Hz),1.10 and 1.21(each 3H,each s),1.52-2.44(14H,m),4.2 5(1H,m),5.33-5.49(2H,m),6.37(1H,d,J=8.7Hz),7.45-7.47(3H,m),7.62-7.66(2H, m),7.69 and 7.80(each 2H,each d,J=7.5Hz,).
IR($CHCl_3$):3449,3058,3027,3012,2925,2870,1708,1655,1513,1481,1043 /cm.
$[\alpha]_D$=+61.0° (MeOH,c=1.01,23°C).

No.2a-146

$CDCl_3$ 300MHz
0.95(1H,d,J=10.5Hz),1.09 and 1.21(each 3H,each s),1.50-2.41(14H,m),4.2 5(1H,m),5.33-5.49(2H,m),6.33(1H,d,J=8.4Hz),7.49-7.61(3H,m),7.91-7.92(2H, m),7.82 and 7.97(each 2H,each d,J=8.7Hz,).
IR($CHCl_3$).3447,3029,3023,3015,2925,2870,1708,1660,1514,1484,1321,1161 /cm.
$[\alpha]_D$=+62.0° (MeOH,c=1.00,22°C).

No.2a-147

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.12 and 1.23(each 3H,each s),1.52-2.46(14H,m),2.5 1(3H,s),4.26(1H,m),5.34-5.51(2H,m),6.23(1H,d,J=8.4Hz),7.26 and 7.64 (each 2H,each d,J=8.4Hz).
IR($CHCl_3$).3453,3027,3015,2925,2870,2665,1708,1648,1596,1516,1484 /cm.
$[\alpha]_D$=+67.7° (MeOH,c=0.82,22°C).

No.2a-148

$[\alpha]_D$=+72.5° (MeOH,c=1.01,25°C).

No.2a-149

$[\alpha]_D$=+67.8° (MeOH,c=0.98,25°C).

No.2a-150

$CDCl_3$ 300MHz
0.94(1H,d,J=10.2Hz),1.10 and 1.23(each 3H,each s),1.52-2.50(14H,m),4.2 2(1H,m),5.36-5.55(2H,m),6.48(1H,d,J=8.4Hz),8.35(1H,s),8.90(1H,s).
IR($CHCl_3$):3443,3374,3091,3024,3012,2925,2871,1709,1652,1525,1494 /cm.
$[\alpha]_D$=+58.1° (MeOH,c=1.01,23°C).
m.p.120.0-122.0°C

No.2a-151

$[\alpha]_D$=+40.6° (MeOH,c=1.01,23°C).

No.2a-152

$CDCl_3$ 300MHz
0.96(1H,d,J=10.5Hz),1.10 and 1.24(each 3H,each s),1.50-2.50(14H,m),2.7 1(3H,s),4.26(1H,m),5.37-5.51(2H,m),6.02(1H,d,J=9.0Hz),8.731(1H,s).
IR($CHCl_3$):3463,3435,3087,3025,3014,2925,2870,1708,1649,1523,1503 /cm.
$[\alpha]_D$=+54.1° (MeOH,c=1.02,22°C).

No.2a-153

$CDCl_3$ 300MHz
0.95(1H,d,J=9.9Hz),1.11 and 1.23(each 3H,each s),1.50-2.50(14H,m),2.50(3H,s),4.26(1H,m),5.36-5.51(2H,m),6.01(1H,d,J=8.4Hz),6.88(1H,d,J=5.1Hz), 7.26(1H,d,J=5.1Hz).
IR($CHCl_3$):3469,3431,3025,3013,2925,2871,2664,1708,1639,1544,1505 /cm.
$[\alpha]_D$=+35.8° (MeOH,c=1.03,22°C).

No.2a-154

$CDCl_3$ 300MHz
0.95(1H,d,J=9.9Hz),1.10 and 1.22(each 3H,each s),1.52-2.46(14H,m),2.51(3H,d,J=1.2Hz),4.26(1H,m),5.34-5.50(2H,m),6.00(1H,d,J=8.4Hz),6.73(1H,dd, J=5.1 and 3.6Hz),7.29(1H,d,J=3.6Hz).
IR($CHCl_3$):3450,3431,3026,3011,2925,2869,1739,1708,1639,1547,1508 /cm.
$[\alpha]_D$=+50.5° (MeOH,c=1.01,22°C).

No.2a-155

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.19 and 1.25(each 3H,each s),1.53-2.48(14H,m),4.3 1(1H,m),5.36-5.51(2H,m),6.79(1H,d,J=9.3Hz),7.29(1H,m),7.41(1H,m),7.48(1 H,s),7.51(1H,m),7.66(1H,d,J=8.1Hz).
IR($CHCl_3$):3436,3029,3024,3015,2925,2871,2670,1708,1659,1598,1510 /cm.
$[\alpha]_D$=+69.1° (MeOH,c=1.01,22°C).

No.2a-156

$CDCl_3$:CD_3O_D=10.1 300MHz
0.99(1H,d,J=9.9Hz),1.11 and 1.21(each 3H,each s),1.56-2.58(14H,m),4.22(1H,m),5.35-5.59(2H,m),6.83(1H,d,J=8.4Hz),7.48(1H,d,J=8.4Hz),7.61(1H,dd, J=1.5 and 8.4Hz),8.09(1H,d,J=1.5Hz),8.12(1H,s).
IR(KBr):3422,3115,2985,2922,2869,2609,1708,1636,1578,1529,1470 /cm.
$[\alpha]_D$=+62.8° (MeOH,c=1.01,22°C).

No.2a-157

$[\alpha]_D$=+40.0° (MeOH,c=0.95,22°C).

No.2a-158

$CDCl_3$ 300MHz
1.00(1H,d,J=10.5Hz),1.17 and 1.24(each 3H,each s),1.54-2.50(14H,m),4.3 4(1H,m),5.36-5.52(2H,m),7.80(1H,d,J=9.0Hz),9.30(1H,s).
IR($CHCl_3$):3410,3122,3030,3012,2925,2871,2668,1709,1667,1538,1466 /cm.
$[\alpha]_D$=+44.9° (MeOH,c=0.99,22°C).

No.2a-159

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.13 and 1.22(each 3H,each s),1.55-2.43(14H,m),3.0 3(6H,s),4.23(1H,m),5.32-5.51(2H,m),6.16(1H,d,J=8.7Hz),6.87 and 7.63 (each 2H,each d,J=8.7Hz).

IR($CHCl_3$):3457,3028,3006,2924,2870,2654,1739,1709,1637,1608,1608,1534, 1501 /cm.
$[\alpha]_D$=+64.8° (MeOH,c=1.01,22°C).

No.2a-160

d_6-DMSO 300MHz
0.83(1H,d,J=9.9Hz),1.02 and 1.19(each 3H,each s),1.38-1.61(3H,m),1.90-2. 32(11H,m),3.90(1H,m),5.41-5.44(2H,m),7.32(1H,dd,J=0.9 and 7.2Hz),7.45-7.60(2H,m),7.77(1H,dd,J=0.9 and 7.8Hz),8.03(1H,d,J=6.9Hz),12.40(1H,s).
IR(Nujol):3315,2924,2856,2656,2535,1737,1703,1637,1598,1581,1541 /cm.
$[\alpha]_D$=+78.5° (MeOH,c=1.01,24°C).
m.p.161.0-162.0°C

No.2a-161

$[\alpha]_D$=+65.3° (MeOH,c=1.00,22°C).

No.2a-162

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.13 and 1.25(each 3H,each s),1.53-2.45(14H,m),4.3 0(1H,m),5.36-5.51(2H,m),6.32(1H,d,J=8.4Hz),7.88 and 8.28(each 2H,each d,J=9.0Hz).
IR($CHCl_3$):3448,3029,3016,2925,2870,1708,1664,1602,1527,1484,1347 /cm.
$[\alpha]_D$=+72.7° (MeOH,c=1.02,22°C).

No.2a-163

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.55-2.51(14H,m),4.2 6(1H,m),5.36-5.57(2H,m),6.68(1H,d,J=7.8Hz),7.41(1H,dd,J=4.8 and 8.1Hz), 8.20(1H,d,J=8.1Hz),8.66(1H,d,J=4.8Hz),9.00(1H,s).
IR($CHCl_3$):3448,3026,3013,2925,2870,2534,1709,1658,1590,1515,1471 /cm.
$[\alpha]_D$=+71.3° (MeOH,c=1.01,22°C).

No.2a-164

$[\alpha]_D$=+40.8° (MeOH,c=0.98,22°C).

No.2a-165

$CDCl_3$ 300MHz
0.96(1H,d,J=10.5Hz),1.11 and 1.24(each 3H,each s),1.55-2.52(14H,m),4.2 4(1H,m),5.37-5.57(2H,m),6.63(1H,d,J=7.8Hz),7.59 and 8.63(each 2H each d,J=6.0Hz).
IR($CHCl_3$):3447,3346,3028,3016,2925,2870,2538,1941,1708,1662,1556,1516 /cm.
$[\alpha]_D$=+75.4° (MeOH,c=1.01,22°C).

No.2a-166

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.22(each 3H,each s),1.51-2.44(14H,m),2.9 5(6H,s),4.25(1H,m),5.33-5.50(2H,m),6.19(1H,d,J=8.7Hz),6.77 and 6.97 (each 2H,each d,J=8.4Hz),6.94 and 7.65(each 2H,each d,J=9.0Hz).
IR($CHCl_3$):3453,3024,3016,2924,2871,2806,1739,1708,1647,1612,1604,1515, 1490 /cm.
$[\alpha]_D$=+53.1° (MeOH,c=1.02,23°C).
m.p.104.0-105.5°C

No.2a-167

$CDCl_3$ 300MHz
1.01(1H,d,J=9.9Hz),1.19 and 1.26(each 3H,each s),1.56-2.53(14H,m),4.37(1H,m),5.35-5.55(2H,m),6.47(1H,d,J=8.4Hz),7.61-7.71(2H,m),7.79(2H,s),7.89 -7.97(2H,m),8.27(1H,d,J=2.1Hz),8.66-8.73(2H,m).
IR($CHCl_3$):3450,3024,3014,2925,2870,2667,1707,1650,1531,1509 /cm.
$[\alpha]_D$=+70.5° (MeOH,c=1.00,22°C).

No.2a-168

$CDCl_3$ 300MHz
1.02(1H,d,J=10.2Hz),1.20 and 1.26(each 3H,each s),1.56-2.50(14H,m),4.3 8(1H,m),5.36-5.56(2H,m),6.51(1H,d,J=8.4Hz),7.61-7.93(7H,m),8.74(1H,d,J= 8.4Hz),9.15(1H,s).
IR($CHCl_3$):3517,3451,3060,3028,3011,2925,2870,2664,1709,1651,1519,1498/cm.
$[\alpha]_D$=+54.4° (MeOH,c=1.00,23°C).

No.2a-169

$CDCl_3$ 300MHz
0.96(1H,d,J=10.5Hz),1.09 and 1.21(each 3H,each s),1.50-2.44(14H,m),3.8 5(3H,s),4.24(1H,m),5.32-5.48(2H,m),6.19(1H,d,J=8.4Hz),6.94 and 7.45 (each 2H,each d,J=9.0Hz),7.11 and 7.45(each 2H,each d,J=8.7Hz).
IR($CHCl_3$):3516,3453,3029,3009,2925,2870,2840,2665,1708,1650,1593,1515, 1493,1482 /cm.
$[\alpha]_D$=+57.8° (MeOH,c= 1.00,23°C).

No.2a-170

$CDCl_3$ 300MHz 0.98(1H,d,J=10.2Hz),1.15 and 1.24(each 3H,each s),1.52-2.50(14H,m),4.2 8(1H,m),5.33-5.54(2H,m),6.25(1H,d,J=8.2Hz),7.38-7.44(2H,m),7.74(1H,s),7. 81-7.86(2H,m).
IR($CHCl_3$):3517,3448,3427,3024,3013,2925,2870,2669,1708,1650,1562,1535, 1500 /cm.
$[\alpha]_D$=+61.6° (MeOH,c=1.00,23°C).

No.2a-171

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz,1.11 and 1.22(each 3H,each s),1.52-2.42(14H,m),2.48 (3H,s),4.21(1H,m),5.31-5.52(2H,m),6.06(1H,d,J=8.2Hz),6.97 and 7.59 (e ach 1H,each d,J=1.2Hz).
IR($CHCl_3$):3452,3113,3028,3007,2925,2870,2669,1708,1645,1554,1509 /cm.
$[\alpha]_D$=+52.4° (MeOH,c=1.00,23°C).

No.2a-172

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.09 and 1.28(each 3H,each s),1.50-2.40(14H,m),2.6 9(3H,s),4.24(1H,m),5.35-5.51(2H,m),5.96(1H,d,J=8.7Hz),7.03 and 7.07 (each 1H,each d,J=5.4Hz).
IR($CHCl_3$):3451,3031,3013,2925,2870,2666,1708,1647,1542,1497 /cm.
$[\alpha]_D$=+51.2° (MeOH,c=1.00,23°C).

No.2a-173

$CDCl_3$ 300MHz
0.95(1H,d,J=10.2Hz),1.10 and 1.23(each 3H,each s),1.50-2.45(14H,m),4.2 2(1H,m),5.35-5.49(2H,m),6.05(1H,d,J=8.4Hz),7.26 and 7.75(each 1H,each d,J=1.5Hz).
IR($CHCl_3$):3451,3011,3029,3011,2925,2870,1708,1652,1538,1500 /cm.
$[\alpha]_D$=+50.6° (MeOH,c=1.01,23°C).

No.2a-174

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.13 and 1.23(each 3H,each s),1.52-2.50(14H,m),4.2 9(1H,m),5.35-5.51(2H,m),7.02(1H,d,J=8.4Hz),7.32 and 8.16(each 1H,each d,J=3.9Hz).
IR($CHCl_3$):3417,3115,3023,3014,2925,2870,1708,1645,1530 /cm.
$[\alpha]_D$=+48.8° (MeOH,c=1.02,23°C).

No.2a-175

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.14 and 1.23(each 3H,each s),1.50-2.52(14H,m),2.5 2(3H,s),4.29(1H,m),5.34-5.51(2H,m),7.78(1H,d,J=9.0Hz),7.24 and 7.52 (each 1H,each d,J=5.4Hz).
IR($CHCl_3$):3329,3093,3023,3015,2924,2871,1708,1640,1526 /cm.
$[\alpha]_D$=+45.0° (MeOH,c=1.01,23°C).

No.2a-176

$CDCl_3$ 300MHz
0.95(1H,d,J=10.5Hz),1.09 and 1.23(each 3H,each s),1.52-2.46(14H,m),2.4 0(3H,d,J=0.9Hz),4.24(1H,m),5.35-5.51(2H,m),6.05(1H,d,J=8.7Hz),6.95(1H, m),7.57(1H,d,J=3.3Hz).
IR($CHCl_3$):3517,3444,3103,3024,3013,2926,2870,1739,1708,1649,1636,1507/cm.
$[\alpha]_D$=+54.8° (MeOH,c=1.01,23°C).
m.p.97.0-99.0°C

No.2a-177

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.52-2.45(14H,m),3.9 3(3H,s),4.27(1H,m),5.34-5.50(2H,m),6,35(1H,d,J=3.3Hz),7.80(1H,d,J=8.7Hz),8.10(1H,d,J=3.3Hz).
IR($CHCl_3$):3395,3121,3031,3019,3012,2925,2871,1739,1709,1640,1557,1533 /cm.
$[\alpha]_D$=+22.8° (MeOH,c=1.01,23°C).
m.p.109.0-112.0°C

No.2a-178

$CDCl_3$ 300MHz
0.96(1H,d,J=10.5Hz),1.10 and 1.23(each 3H,each s),1.51-2.45(14H,m),4.2 4(1H,m),5.35-5.50(2H,m),6.09(1H,d,J=8.4Hz),7.17-7.31(6H,m),7.95(1H,d,J= 1.5Hz).
IR($CHCl_3$):3510,3451,3062,3031,3022,3011,2925,2870,2662,1708,1651,1582, 1535,1497,1477/cm.
$[\alpha]_D$=+47.9° (MeOH,c=1.01,25°C).

No.2a-179

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.14 and 1.24(each 3H,each s),1.52-2.48(14H,m),4.3 0(1H,m),5.36-5.52(2H,m),6.73(1H,d,J=9.0Hz),6.26 and 7.37(each 1H,each d,J=6.0Hz).
IR($CHCl_3$):3509,3429,3115,3094,3025,3014,2925,2871,2666,1708,1649,1529, 1510 /cm.
$[\alpha]_D$=+51.0° (MeOH,c=1.02,25°C).

No.2a-180

$CDCl_3$ 300MHz
0.95(1H,d,J=10.2Hz),1.14 and 1.24(each 3H,each s),1.52-2.46(14H,m),3.8 9(3H,s),4.21(1H,m),5.35-5.50(2H,m),6.05(1H,d,J=8.4Hz),6.46 and 7.04 (each 1H,each d,J=1.8Hz).
IR($CHCl_3$):3516,3450,3114,3031,3010,2925,2871,1708,1648,1546,1511,1477 /cm.
$[\alpha]_D$=+49.1° (MeOH,c=1.01,25°C).

No.2a-181

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.14 and 1.23(each 3H,each s),1.52-2.48(14H,m),2.4 2(3H,s),4.31(1H,m),5.34-5.52(2H,m),8.07(1H,d,J=9.3Hz),7.27 and 8.17 (each 1H,each d,J=3.3Hz).
IR($CHCl_3$):3510,3301,3112,3023,3007,2924,2871,2663,1708,1636,1534 /cm.
$[\alpha]_D$=+41.0° (MeOH,c=0.96,25°C).

No.2a-182

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.53-2.46(14H,m),2.5 1(3H,s),4.21(1H,m),5.35-5.51(2H,m),6.05(1H,d,J=8.1Hz),7.26 and 7.78 (each 1H,each d,J=1.8Hz).
IR($CHCl_3$):3509,3450,3109,3024,3012,2925,2870,2666,1708,1650,1535,1 498,1471 /cm.
$[\alpha]_D$=+52.9° (MeOH,c=0.95,25°C).

No.2a-183

$CDCl_3$ 300MHz
0.96(1H,d,J=10.5Hz),1.12 and 1.22(each 3H,each s),1.52-2.46(14H,m),4.2 5(1H,m),5.33-5.51(2H,m),6.17(1H,d,J=8.7Hz),7.01-7.05(3H,m).7.14 and 7.6 2(each 2H,each d,J=8.7Hz),7.27-7.34(2H,m).
IR($CHCl_3$):3428,3026,3015,2925,2870,2666,1739,1708,1643,1613,1594,1526, 1499 /cm.
$[\alpha]_D$=+64.8° (MeOH,c=1.02,23°C).

No.2a-184

$CDCl_3$ 300MHz
1.01(1H,d,J=10.2Hz),1.18 and 1.26(each 3H,each s),1.55-2.50(14H,m),4.3 5(1H,m),5.35-5.55(2H,m),6.42(1H,d,J=8.7Hz),7.46-7.52(2H,m).7.73(1H,dd,J =1.8 and 8.4Hz),7.83-7.89(2H,m),8.21(1H,m),8.59(1H,d,J=1.5Hz).
IR($CHCl_3$):3451,3031,3014,2925,2870,2660,1739,1708,1650,1604,1513,1463 /cm.
$[\alpha]_D$=+58.3° (MeOH,c=1.00,23°C).

No.2a-185

$CDCl_3$ 300MHz
1.00(1H,d,J=10.2Hz),1.18 and 1.25(each 3H,each s),1.55-2.50(14H,m),4.3 4(1H,m),5.35-5.54(2H,m),6.36(1H,d,J=8.7Hz),7.37(1H,t,J=7.4Hz),7.50(1H,m),7.57-7.59(2H,m),7.79(1H,dd,J=1.8 and 8.1Hz),7.99(1H,d,J=7.8Hz),8.39(1 H,d,J=1.8Hz).
IR($CHCl_3$):3451,3030,3020,2870,2665,1708,1652,1632,1603,1586,1514,1469, 1448 /cm.
$[\alpha]_D$=+59.4° (MeOH,c=1.01,24°C).

No.2a-186

$CDCl_3$ 300MHz
1.00(1H,d,J=10.5Hz),1.17 and 1.25(each 3H,each s),1.54-2.50(14H,m),4.3 3(1H,m),5.35-5.54(2H,m),6.37(1H,d,J=8.7Hz),7.37(1H,t,J=7.4Hz),7.51(1H,t, J=7.8Hz),7.56(1H,m), 7.70(1H,dd,J=1.2 and 8.4Hz),7.97(3H,m).
IR($CHCl_3$):3451,3030,3014,2924,2870,2671,1739,1708,1652,1577,1517,1488, 1471 /cm.
$[\alpha]_D$=+72.2° (MeOH,c=1.00,24°C).

No.2a-187

$CDCl_3$ 300MHz
1.00(1H,d,J=9.8Hz),1.18 and 1.25(each 3H,each s),1.54-2.53(14H,m),4.07(3H,s),4.37(1H,m),5.30-5.54(2H,m),7.34(1H,m),7.47(1H,s),7.47-7.60(2H,m),7. 93(1H,d,J=7.8Hz),8.43(1H,s),8.49(1H,d,J=9.0Hz).
IR($CHCl_3$):3397,3074,3027,3020,3009,2924,1738,1708,1647,1633,1534,1465, 1453 /cm.
$[\alpha]_D$=+43.7° (MeOH,c=1.01,25°C).

No.2a-188

$CDCl_3$ 300MHz
0.97(1H,d,J=10.2Hz),1.11 and 1.23(each 3H,each s),1.53-2.50(14H,m),4.2 3(1H,m),5.37-5.50(2H,m),6.10(1H,d,J=9.0Hz),6.20(1H,m),6.51(1H,m),6.97(1 H,m),10.81(1H,brs).
IR($CHCl_3$):3450,3236,3112,3029,3015,2925,2871,2645,1701,1616,1558,1516 /cm.
$[\alpha]_D$=+50.6° (MeOH,c=1.01,24°C).

No.2a-189

$CDCl_3$ 300MHz
0.94(1H,d,J=9.9Hz),1.11 and 1.23(each 3H,each s),1.50-2.46(14H,m),3.93(3H,s),4.18(1H,m),5.35-5.52(2H,m),6.03(1H,d,J=9.3Hz),6.09(1H,m),6.48(1H, m),6.73(1H,m).
IR($CHCl_3$):3452,3102,3028,3007,2925,2871,2666,1739,1708,1650,1536,1499, 1471 /cm.
$[\alpha]_D$=+49.8° (MeOH,c=1.01,23°C).
m.p.101.5-103.5°C

No.2a-190

$CDCl_3$ 300MHz
0.94(1H,d,J=10.2Hz),1.11 and 1.21(each 3H,each s),1.54-2.47(14H,m),4.2 3(1H,m),5.33-5.52(2H,m),6.06(1H,d,J=9.0Hz),6.34(1H,m),6.75(1H,m),6.36(1 H,m),9.71(1H,brs).
IR($CHCl_3$):3470,3215,3030,3020,3010,2925,2871,2664,1709,1613,1564,1510/cm.
$[\alpha]_D$=+43.3° (MeOH,c=1.01,24°C).

No.2a-191

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.11 and 1.22(each 3H,each s),1.55-2.44(14H,m),3.6 6(3H,s),4.20(1H,m),5.35-5.51(2H,m),5.93(1H,d,J=8.4Hz),6.27(1H,dd,J=1.8 and 2.7Hz),6.56(1H,t,J=2.7Hz),7.19(1H,t,J=1.8Hz).
IR($CHCl_3$):3452,3031,3018,3006,2925,2871,2662,1736,1710,1634,1609,1556, 1498 /cm.
$[\alpha]_D$=+43.1° (MeOH,c=1.01,23°C).

No.2a-192

$CDCl_3$ 300MHz
0.96(1H,d,J=10.5Hz),1.11 and 1.21(each 3H,each s),1.43(3H,t,J=7.5Hz),1. 54-2.44(14H,m),3.93(2H,q,J=7.5Hz),4.21(1H,m),5.33-5.51(2H,m),5.94(1H,d, J=8.4Hz),6.27(1H,dd,J=1.8 and 2.7Hz),6.62(1H,t,J=2.7Hz),7.26(1H,t,J=1.8 Hz).
IR($CHCl_3$):3630,3452,3032,3018,3006,2925,2871,2661,1735,1710,1633,1610, 1555,1497 /cm.
$[\alpha]_D$=+40.1° (MeOH,c=1.00,23°C).

No.2a-193

$CDCl_3$ 300MHz
0.95(1H,d,J=10.2Hz),1.10 and 1.22(each 3H,each s),1.53-2.49(14H,m),2.5 8(3H,s),4.21(1H,m),5.35-5.54(2H,m),6.15(1H,d,J=8.1Hz),6.52(1H,dd,J=1.8 and 3.6Hz),7.29(1H,t,J=3.6Hz),7.94(1H,t,J=1.8Hz).
IR($CHCl_3$):3516,3450,3410,3152,3027,3015,2925,2871,2670,1732,1648,1574, 1509 /cm.
$[\alpha]_D$=+45.0° (MeOH,c=1.01,25°C).

No.2a-194

$CDCl_3$ 300MHz
0.99(1H,d,J=10.2Hz),1.11 and 1.24(each 3H,each s),1.52-2.53(14H,m),4.3 4(1H,m),5.33-5.57(2H,m),6.21(1H,d,J=8.6Hz),7.35-7.50(2H,m),7.83(1H,s),7. 86(1H,m),.8.31(1H,m).
IR($CHCl_3$):3443,3067,3013,2925,2870,2665,1708,1651,1515,1493 /cm.
$[\alpha]_D$=+55.7° (MeOH,c=1.01,23°C).

No.2a-195

$CDCl_3$ 300MHz
1.01(1H,d,J=10.0Hz),1.06 and 1.26(each 3H,each s),1.50-2.64(14H,m),2.6 8(3H,s),4.40(1H,m),5.36-5.61(2H,m),6.02(1H,d,J=9.4Hz),7.30-7.42(2H,m),7. 73-7.86(2H,m).
IR($CHCl_3$):3510,3434,3062,3029,3014,2924,2871,2669,1708,1650,1563,1539, 1500 /cm.
$[\alpha]_D$=+72.4° (MeOH,c=1.00,23°C).
m.p.111.0-112.0°C

No.2a-196

$CDCl_3$ 300MHz
0.42 and 1.04(each 3H,each s),0.80(1H,d,J=10.0Hz),1.11-2.48(14H,m),2.2 4(3H,s),4.02(1H,m),5.23-5.44(2H,m),5.53(1H,d,J=8.8Hz),7.27-7.31(2H,m),7. 42-7.48(3H,m),7.93(1H,s).
IR($CHCl_3$):3419,3114,3025,3006,2924,2871,2662,1737,1709,1636,1540,1519 /cm.
$[\alpha]_D$=+43.7° (MeOH,c=1.01,23°C).

No.2a-197

$CDCl_3$ 300MHz
0.95(1H,d,J=10.0Hz),1.09 and 1.23(each 3H,each s),1.54-2.46(18H,m),2.7 7(4H,brs),4.21(1H,m),5.32-5.54(2H,m),6.02(1H,d,J=8.6Hz),7.43(1H,s).
IR($CHCl_3$):3445,3101,3024,3014,2928,2865,2661,1739,1708,1646,1550,1507 /cm.
$[\alpha]_D$=+51.9° (MeOH,c=1.01,23°C).

No.2a-198

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.11 and 1.22(each 3H,each s),1.50-2.44(14H,m),4.2 4(1H,m),4.42(2H,s),5.35-5.49(2H,m),6.25(1H,d,J=8.1Hz),7.33(1H,m),7.43(1 H,dd,J=1.5and 7.5Hz),7.49(1H,d,J=8.1Hz),7.60-7.63(1H,m),7.68(1H,dd,J=1. 8 and 7.8Hz),8.02(1H,d,J=1.8Hz),8.19(1H,dd,J=1.5 and 8.1Hz).
IR($CHCl_3$):3448,3030,3012,2925,2870,1739,1708,1671,1588,1559,1514,1472 /cm.
$[\alpha]_D$=+56.9° (MeOH,c=1.01,24°C).

No.2a-199

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.11 and 1.22(each 3H,each s),1.51-2.46(14H,m),3.4 0(1H,m),3.76(1H,m),4.24(1H,m),5.33-5.51(3H,m),6.25(1H,m),7.16(1H,m),7.2 4-7.33(2H,m),7.46(1H,d,J=7.5Hz),7.52-7.60(2H,m),7.85(1H,dd,J=1.8 and 4. 5Hz).
IR($CHCl_3$):3583,3447,3062,3028,3013,2924,2871,2663,1708,1651,1600,1557, 1514,1471 /cm.
$[\alpha]_D$=+54.8° (MeOH,c=1.00,23°C).

No.2a-200

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.12 and 1.23(each 3H,each s),1.51-2.46(14H,m),4.2 5(1H,m),5.34-5.51(2H,m),6.25(1H,d,J=8.4Hz),7.02 and 7.10(each,1H,each d,J=12.3Hz),7.23-7.33(4H,m),7.50(1H,m),7.64(1H,dd,J=1.8 and 7.8Hz),7.8 2(1H,d,J=1.8Hz).
IR($CHCl_3$):3450,3060,3025,3014,2925,2871,2662,1708,1653,1596,1542,1513, 1473 /cm.
$[\alpha]_D$=+62.5° (MeOH,c=1.00,24°C).

No.2a-201

$CDCl_3$ 300MHz
0.95(1H,d,J=9.9Hz),1.15 and 1.22(each 3H,each s),1.55-2.60(14H,m),4.26(1H,m),5.35-5.63(2H,m),7.14(1H,d,J=9.9Hz),7.34 and 7.40(each,1H,each d, J=12.9Hz),7.62-7.73(4H,m),8.25-8.30(2H,m),8.72(1H,d,J=1.5Hz).

IR($CHCl_3$):3443,3389,3297,3061,3030,3016,2925,2870,1726,1708,1652,160 3,1521,1483,1472,1309 /cm.
$[\alpha]_D$=+61.1° (MeOH,c=1.01,23°C).

No.2a-202

$CDCl_3$ 300MHz
0.96(1H,d,J=10.2Hz),1.09 and 1.22(each 3H,each s),1.52-2.43(14H,m),2.6 3(3H,s),4.25(1H,m),5.33-5.49(2H,m),6.19(1H,d,J=8.4Hz),7.10 and 7.58 (each,2H,each d,J=9.0Hz),7.21(1H,m),7.30-7.32(2H,m),7.46(1H,d,J=7.5Hz)
IR($CHCl_3$):3511,3453,3062,3032,3014,2925 2870,1739,1708,1650,1595,1556, 1516,1482,1471 /cm.
$[\alpha]_D$=+60.2° (MeOH,c=1.01,25°C).

No.2a-203

$CDCl_3$ 300MHz
0.96(1H,d,J=10.5Hz),1.09 and 1.23(each 3H,each s),1.52-2.43(14H,m),4.2 3(1H,m),5.35-5.51(2H,m),5.93(1H,d,J=8.7Hz),6.56(1H,dd,J=0.9 and 1.8Hz), 7.43(1H,t,J=1.8Hz),7.92(1H,dd,J=0.9 and 1.8Hz).
IR($CHCl_3$):3517,3450,3134,3031,3008,2925,2870,2667,1708,1656,1588,1570, 1514 /cm.
$[\alpha]_D$=+46.7° (MeOH,c=0.92,25°C).

No.2b-1

$[\alpha]_D$= +25.6° (MeOH,c=1.01,23°C).

No.2b-2

$[\alpha]_D$= +38.9° (MeOH,c=1.01,24°C).

No2c-1

$[\alpha]_D$= +60.5° (MeOH,c=1.01,22°C).

No.2c-2

$[\alpha]_D$= +55,8° (MeOH,c=0.92,22°C).

No.2c-3

$[\alpha]_D$= +54,7° (MeOH,c=1.01,22°C).

No.2d-1

$[\alpha]_D$= -6.2° (MeOH,c=1.00,21°C).

No.2d-2

$[\alpha]_D$=+15.8° (MeOH,c=0.34,22°C).

No.2d-3

$[\alpha]_D$=+31.6° (MeOH,c=1.01,22°C).

No.2e-1

$[\alpha]_D$= -9.4° (MeOH,c=1.00,22°C).

No.2e-2

$[\alpha]_D$= -1.8° (MeOH,c=1.02,23°C).

No.2e-3

$[\alpha]_D$= -6.7° (MeOH,c=1.01,23°C).

No.2f-1

$[\alpha]_D$= +6.8° (MeOH,c=1.01,23°C).

No.2f-2

$[\alpha]_D$= -2.6° (MeOH,c=1.00,22°C).

No.2f-3

$[\alpha]_D$= -3.5° (MeOH,c=1.01,22°C).

No.2g-1

$[\alpha]_D$= +54,6° (MeOH,c=1.01,24°C).

No.3a-2

$CDCl_3$ 300MHz
0.98-2.15(14H,m),2.31(2H,t,J=7.2Hz),2.35-2.40(1H,m),3.10-3.20(1H,m), 5.00(1H,d,J=6.9Hz),5.30-5.48(2H,m),6.75(1H,d,J=10.2Hz),7.38-7.52(6H,m).
IR($CDCl_3$):3266,3028,2954,2874,1709,1620,1448,1412,1318,1141,970,892/cm.
$[\alpha]_D$=+20.3±0.6 ° ($CHCl_3$,c=1.05,24°C).

No.3a-3

$CDCl_3$ 300MHz
0.95-2.00(14H,m),2.20-2.29(3H,m),3.00-3.08(1H,m),3.66(3H,s),5.00(1H,d, J=6.6Hz),5.13-5.29(2H,m),7.38-7.52(3H,m),7.59-7.65(2H,m),7.69-7.75(2H,m),7.92-7.98(2H,m).
IR($CHCl_3$):3376,3018,2946,2868,1727,1594,1436,1395,1322,1157,1095,890 /cm.
$[\alpha]_D$=+2.3±0.4 ° ($CHCl_3$,c=1.03,22°C).
mp.65-66.5°C

No.3a-4

$CDCl_3$ 300MHz
0.93-2.05(14H,m),2.15-2.22(1H,m),2.31(2H,t,J=7.2Hz),3.01-3.10(1H,m), 5.18-5.31(3H,m),7.38-7.52(3H,m),7.58-7.66(2H,m),7.69-7.76(2H,m),7.92-7.98(2H,m)
IR($CHCl_3$):3374,3260,3020,2948,2868,1708,1594,1479,1396,1319,1156,1095, 1052,891/cm.
$[\alpha]_D$=+13.1±0.5 ° ($CHCl_3$,c=1.16,24°C).

No.3a-6

CD_3OD 300MHz
1.04-1.95(14H,m),2.07(2H,t,J=7.8Hz),2.14-2.22(1H,m),2.94-3.00(1H,m), 5.04-5.25(2H,m),7.36-7.52(3H,m),7.66-7.71(2H,m),7.78-7.85(2H,m),7.91-7.97(2H,m).
IR(KBr):3421,3278,2951,2872,1562,1481,1409,1317,1156,1097,1057,895/cm.
$[\alpha]_D$=-15.3±0.5 ° ($CHCl_3$,c=1.06,23°C).
mp.105-112°C

No.3a-11

$CDCl_3$ 300MHz
0.90-2.04(14H,m),2.08-2.19(1H,m),2.35(2H,t,J=7.2Hz),2.95-3.04(1H,m), 5.17-5.32(3H,m),7.56-7.63(2H,m),7.83-7.95(2H,m).
IR($CHCl_3$):3260,3020,2948,2868,1707,1569,1456,1383,1325,1268,1160,1088, 1053,1006,892/cm.
$[\alpha]_D$=+8.3±0.5 ° ($CHCl_3$,c=1.00,22°C).

No.3a-16

$CDCl_3$ 300MHz
0.80-1.90(14H,m),1.98-2.04(1H,m),2.27(2H,t,J=7.2Hz),2.88(6H,s),2.90-2.98(1H,m),4.88-5.00(2H,m),5.13(1H,d,J=7.2Hz),7.18(1H,d,J=7.5Hz),7.48-7.60(2H,m),8.25-8.33(2H,m),8.53(1H,d,J=8.7Hz).
IR($CHCl_3$):3272,3020,2946,2866,2782,1708,1573,1455,1407,1311,1229,1160, 1142,1070,942,891/cm.
$[\alpha]_D$=-19.7±0.6 ° ($CHCl_3$,c=1.08,23.5°C).

No.3a-31

$CDCl_3$ 300MHz
0.80-1.85(14H,m),2.02-2.08(1H,m),2.20(2H,t,J=7.2Hz),2.85-2.95(1H,m), 3.68(3H,s),4.80-4.92(2H,m),4.96(1H,d,J=6.9Hz),7.50-7.70(3H,m),7.92-7.98(1H,m),8.07(1H,d,J=8.4Hz),8.29(1H,dd,J=1.5&7.5Hz),8.65(1H,LI;):3374,3016,2946,2868,1727,1506,1435,1318,1160,1133,1105,1051, 984,890/cm.
$[\alpha]_D$=-39.3±0.8 ° ($CHCl_3$,c=1.07,22°C).

No.3a-32

$CDCl_3$ 300MHz
0.80-1.90(14H,m),1.95-2.05(1H,m),2.27(2H,t,J=7.2Hz),2.90-2.96(1H,m), 4.85-5.00(2H,m),5.23(1H,d,J=6.6Hz),7.50-7.72(3H,m),7.95(1H,d,J=8.1Hz),
8.07(1H,d,J=8.4Hz),8.29(1H,dd,J=1.2&7.5Hz),8.66(1H,d,J=9.0Hz).
IR($CHCl_3$):3270,3020,2948,2868,1708,1455,1412,1317,1159,1132,1104,1079, 1051,983,891/cm.
$[\alpha]_D$=-29.2±0.6 ° ($CHCl_3$,c=1.08,22°C).

No.3a-33

CD_3OD 300MHz
0.94-1.84(14H,m),1.96-2.08(3H,m),2.77-2.84(1H,m),4.67-4.84(2H,m),7.55-7.75(3H,m),8.02(1H,d,J=7.8Hz),8.12-8.26(2H,m),8.74(1H,d,J=8.7Hz).
IR(KBr):3432,3298,2951,2872,1564,1412,1315,1159,1134,1107,1082,1058, 986/cm.
$[\alpha]_D$=-79.9±1.2 ° (CH_3OH,c=1.00,23°C).

No.3a-34

$CDCl_3$ 300MHz
0.97-1.91(14H,m),2.13-2.20(1H,m),2.42(2H,t,J=7.2Hz),3.00-3.07(1H,m), 5.06-5.24(2H,m),5.33(1H,d,J=6.9Hz),7.57-7.68(2H,m),7.82-8.00(4H,m), 8.45(1H,d,J=1.2Hz)
IR($CHCl_3$):3260,3020,2948,1708,1408,1319,1154,1129,1073,953,893/cm.
$[\alpha]_D$=+20.7±0.6 ° ($CHCl_3$,c=1.07,22°C).

No.3a-35

CD_3OD 300MHz
1.03-2.20(m,17H),2.97(m,1H),5.02(m,2H),7.64(m,2H),8.00(m,4H),8.43 (S,1H).
IR(KBr):3360,3285,1562,1407,1316,1153,1130,1075/cm.
$[\alpha]_D$=0
$[\alpha]_{365}$=+20.9±0.6 ° (CH_3OH,c=1.04,23°C).

No.3d-1

$CDCl_3$ 300MHz
0.93-2.55(m,17H),3.02(m,1H),5.24(m,2H),6.48(m,1H),7.35-7.60(m,3H),7.85-8.00(m,2H)
IR(Nujol): 3275,1548,1160,1094,758,719,689,591,557/cm.
$[\alpha]_D$=+19.0±0.6° (CH_3OH,c=1.010,26.5°C).

Elemental analysis ($C_{20}H_{26}NO_4S$ 1/2Ca 1.0 H_2O)					
Calcd.:	C, 57.94;	H, 6.82;	N, 3.38;	Ca, 4.83;	H_2O, 4.35
Found:	C, 57.80;	H, 6.68;	N, 3.68;	Ca, 5.06;	H_2O, 4.50

No.3d-6

$[\alpha]_D$=-20.7±0.6 ° ($CHCl_3$,c=1.00,24°C).

No.3d-7

$[\alpha]_D$=-3.2±0.4 ° ($CHCl_3$:c=1.03,22°C).
mp.65-67°C

No.3d-8

$[\alpha]_D$=-14.5±0.5 ° ($CHCl_3$,c=1.07,24°C).

No.3d-9

$[\alpha]_D$=+12.2±0.5 ° (CH_3OH,c=1.00,23°C).
mp.119-125°C

No.3d-10

$[\alpha]_D$=+39.7±0.8 ° ($CHCl_3$,c=1.07,22°C).

No.3d-11

$[\alpha]_D$=+29.2±0.7 ° ($CHCl_3$,c=1.06,22°C).

No.3d-12

$[\alpha]_D$=+76.4±1.1 ° (CH_3OH,c=1.03,24°C).

No.3d-14

$[\alpha]_D$=-20.6±0.6 ° ($CHCl_3$,c=1.07,22°C).

No.3d-15

$[\alpha]_{365}$=-28.0±0.7 ° (CH_3OH,c=1.03,24.5°C).

No.3d-16

$[\alpha]_D$=-8.7±0.5 ° ($CHCl_3$,c=1.06,22°C).

No.3d-17

$CDCl_3$ 300MHz
0.80-2.15(m,24H),2.32(t,J=7Hz,2H),2.68(t,J=7Hz,2H),3.02(m,1H),2.15 (m,24H),2.32(t,J=7Hz,2H),2.68(t,J=7Hz,2H),3.02(m,1H),5.22(m,2H),5.38(d, J=7Hz,1H),7.30(A2B2qApart,J=8Hz,2H),7.81(A2B2qBpart,J=8Hz,2H), 9.86 (brs,1H).
$[\alpha]_D \fallingdotseq 0$
$[\alpha]_{365}$=-9.7±0.5° ($CHCl_3$,c=1.03,22°C).

No.3d-24

$[\alpha]_D$=+19.2±0.6 ° ($CHCl_3$,c=1.05,23°C).

No.3d-26

CD_3OD 300MHz
0.90-2.20(20H,m),2.88(1H,m),3.07(2H,q,J=7.0Hz),5.00-5.40(2H,m),7.20-7.60(4H,m),7.95(1H,m).
IR(KBr):3415,3254,1698,1564,1314,1154/cm.

No.3d-28

CD_3OD 300MHz
0.90-2.20(20H,m),2.73(2H,q,J=7.0Hz),2.93(1H,m),5.00-5.30(2H,m),7.40-7.50(2H,m),7.60-7.77(2H,m).
IR(KBr):3435,3280,1562,1323,1304,1151/cm.

No.3d-30

Elemental analysis ($C_{20}H_{25}BrNO_4SNa$)						
Calcd.:	C50.21;	H5.27;	Br16.70;	N2.93;	S6.70;	Na4.81
Found:	C50.22;	H5.40;	Br15.57;	N2.88;	S6.41;	Na5.10

IR(KBr):3425,3280,3085,1697,1570,1410,1321,1165,1155/cm.

No.3e-1

CD_3OD 300MHz
0.71(1H,d,J=10.2Hz),1.04(3H,s),1.12(3H,s),1.35-2.28(14H,m), 2.42(3H,s),3.17-3.25(1H,m),5.18-5.39(2H,m),7.37(2H,d,J=8.4Hz),7.75(2H,d,J=8.4Hz).
IR($CHCl_3$):3400,3289,2986,2924,2870,1559,1424,1322,1305,1160,1095,1075, 1030/cm.
$[\alpha]_D$=+25.9±0.7 ° (CH_3OH,c=1.00,23°C).

Compounds prepared in Examples above were tested for in vivo and in vitro activity according to the method shown in Experimental examples below.

Experiment 1 Binding to PGD_2 Receptor

Material and Method

(1) Preparation of Human Platelet Membrane Fraction

A Blood sample was obtained using a plastic syringe containing 3.8 % sodium citrate from veins of healthy volunteers (adult male and female), put into a plastic test tube and mixed gently by inversion. The sample was then centrifuged at 1800 rpm, 10 min at room temperature, and supernatant containing PRP (platelet rich plasma) was collected. The PRP was re-centrifuged at 2300 rpm, 22 min at room temperature to obtain platelets. The platelets were homogenized using a homogenizer (Ultra-Turrax) followed by centrifugation 3 times at 20,000 rpm, 10 min at 4°C to obtain a

platelet membrane fraction. After protein determination, the membrane fraction was adjusted to 2 mg/ml and preserved in a refrigerator at -80°C until use.

(2) Binding to PGD_2 Receptor

To a binding-reaction solution (50 mM Tris/HCl, pH 7.4, 5 mM $MgCl_2$) (0.2 ml) were added human platelet membrane fraction (0.1 mg) and 5 nM [^{3}H]PGD_2 (115Ci/mmol), and reacted at 4°C for 90 min. After the reaction finished, the reaction mixture was filtered through a glass fiber filter paper, washed several times with cooled saline, and measurement made of radioactivity retained on the filter paper. The specific binding was calculated by subtracting the non-specific binding (the binding in the presence of 10 μM PGD_2) from the total binding. The binding-inhibitory activity of each compound was expressed as concentration required for 50 % inhibition (IC_{50}), which was determined by depicting a substitution curve by plotting the binding ratio (%) in the presence of each compound, where the binding ratio in the absence of a test compound is 100 %. The results are shown in Table below.

Compound number	Activity (μM)	compound number	activity (μM)
3a-4	0.6	2a-4	0.54
1a-115	8.6	2a-17	0.12
1a-28	0.045	2a-21	5.2
1a-47	0.0086	2a-28	0.046
1a-100	0.56	2a-95	1.6
1a-176	0.047	2a-109	0.003
1a-2	0.13	1a-162	0.027

Experiment 2 Evaluation of Antagonistic Activity Against PGD_2 Receptor Using Human Platelet

Peripheral blood was obtained from a healthy volunteer using a syringe in which 1/9 volume of citric acid/dextrose solution had been previously added. The syringe was subjected to centrifugation at 180 g for 10 min to obtain the supernatant (PRP: platelet rich plasma). The resultant RRP was washed 3 times with a washing buffer and the number of platelets was counted with a micro cell counter. A suspension adjusted to contain platelets at a final concentration of 5 x 10^8/ml was warmed at 37°C, and then subjected to the pretreatment with 3-isobutyl-1-methylxanthine (0.5mM) for 5 min. To the suspension was added a test compound diluted at various concentrations. Ten-minutes later, the reaction was induced by the addition of 0.1-2.0 μM PGD_2 and, 15-minutes later, stopped by the addition of HCl. The platelets were destroyed with an ultrasonic homogenizer. After centrifugation, the cAMP in the supernatant was determined by radioassay. PGD_2 receptor antagonism of a drug was evaluated as follows. The inhibition rate regarding cAMP increased by the addition of PGD_2 was determined at individual concentration, and then the concentration of the drug required for 50 % inhibition (IC_{50}) was calculated. The results are shown in the Table below.

Compound number	Inhibition of Increase of Human Platelet cAMP (IC_{50}) (μM)
3a-16	0.37
1a-12	12.11
1a-28	0.30
1a-47	2.09
2a-2	0.77
2a-4	0.94
2a-35	1.52
2a-75	0.71

Experiment 3 Experiment Using Nasal Occlusion Model

The method used for measuring the nasal cavity resistance and evaluating the anti-nasal occlusion using a guinea pig are described below.

A 1% ovalbumin (OVA) solution was treated with an ultrasonic nebulizer to obtain an aerosol. A Hartley male guinea pig was sensitized by inhaling twice the aerosol for 10 min at one-week intervals. Seven-days after the sensitization, the guinea pig was exposed to an antigen to initiate the reaction. Then the trachea was incised under anesthesia with pentobarbital (30 mg/kg, i.p.) and cannulas were inserted into the trachea at the pulmonary and nasal cavity sides. The canal inserted at the pulmonary side was connected with an artificial respirator that provides 4 ml air 60 times/min. After arresting the spontaneous respiration of a guinea pig with Garamin (2 mg/kg, i.v.), air was supplied to the snout side with an artificial respirator at the frequency of 70 times/min, and the flow rate of 4 ml air/time, and the atmospheric pressure required for the aeration was measured by the use of a transducer fitted at the branch. The measurement was used as a parameter of the nasal cavity resistance. The exposure of an antigen was carried out by generating aerosol of 3 % OVA solution for 3 min between the respirator and nasal cavity cannula. The test drug was injected intravenously 10 min before the antigen exposure. The nasal resistance between 0 to 30 min was measured continuously and the effect was expressed as inhibition rate to that obtained for vehicle using the AUC for 30 min (on the vertical axis, nasal cavity resistance (cm H_2O), and on the horizontal axis, time (0 - 30 min)) as an indication. The result is shown below.

Compound number	Inhibition Rate (%) 1 mg/kg (i.v.)	Remarks
1a-28	44	
1a-98	69	
1a-100	50	
1a-115	66	
1a-116	48	
1a-120	58	3mg/kg (i.v.)
1a-2	82	
1a-162	80	
1a-176	60	
1a-267	62	
2a-4	60	
2a-21	52	
2a-28	54	
2a-95	77	
2a-96	77	10mg/kg(p.o.)
2a-109	73	
2a-110	66	10mg/kg(p.o.)
22a-194	79	

Formulation 1 Preparation of Tablets

Tablets each containing 40 mg of active ingredient were prepared in a conventional manner. The ingredients for 40 mg tablet are as follows:

Calcium (+)-(Z)-7-[(1R,2S,3S,4S)-3-benzenesulfonamidobicyclo[2.2.1]hept-2-yl]-5-heptenoate dihydrate	40.0 mg
Hydroxypropyl cellulose	3.6 mg
Magnesium stearate	0.4mg
Cornstarch	18.0 mg
Lactose	58.0 mg
	Total 120.0 mg

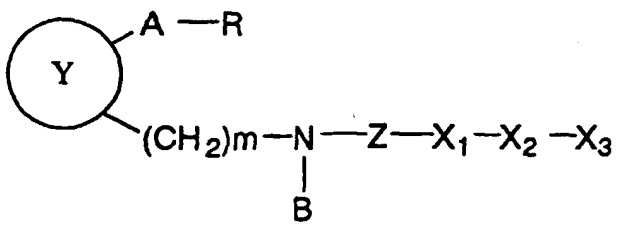
Formulation 2 Preparation of Granules

Ingredients:

Calcium (+)-(Z)-7-[(1R,2S,3S,4S)-3-benzenesulfonamidobicyclo[2.2.1]hept-2-yl]-5-heptenoate dihydrate	100.0 mg
Hydroxypropyl cellulose	30.0 mg
Carmellose Calcium	30.0 mg
Talc	10.0 mg
Poloxamer 188	20.0 mg
Crystalline cellulose	70.0 mg
Cornstarch	300.0 mg
Lactose	440.0 mg
	Total 1000.0 mg

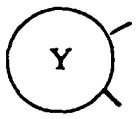
Claims

1. A PGD_2 antagonist comprising a compound of the general formula (I) below or a salt or a hydrate thereof as an active ingredient:



(I)

wherein



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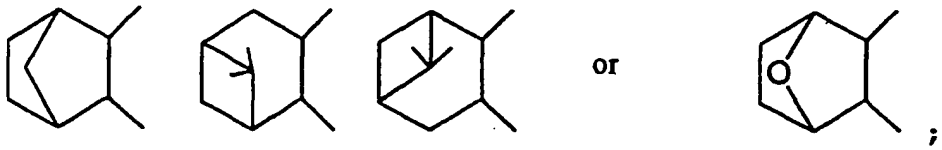
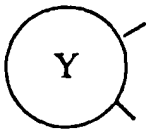


;

A is alkylene which optionally is intervened by a hetero atom or phenylene, contains oxo group, and/or has an unsaturated bond;
B is hydrogen, alkyl, aralkyl or acyl;
R is $COOR_1$, CH_2OR_2 or $CON(R_3)R_4$;
R_1 is-hydrogen or alkyl;
R_2 is hydrogen or alkyl;
R_3 and R_4 each are independently hydrogen, alkyl, hydroxy or alkylsulfonyl;
X_1 is a single bond, phenylene, naphthylene, thiophenediyl, indolediyl, or oxazolediyl;
X_2 is a single bond, -N=N-, -N=CH-, -CH=N-, -CH=N-N-, -CH=N-O-, -C=NNHCSNH-, -C=NNHCONH-, -CH=CH-, -CH(OH)-, -C(Cl)=C(Cl)-, - (CH_2)n-, ethynylene, $-N(R_5)-$, $-N(R_{51})CO-$, $-N(R_{52})SO_2-$, $-N(R_{53})CON(R_{54})-$, $-CON(R_{55})-$ $-SO_2N(R_{56})-$, -O-, -S-, -SO-, $-SO_2-$, -CO-, oxadiazolediyl, thiadiazolediyl or tetrazolediyl;
X_3 is alkyl, alkenyl, alkynyl, aryl, aralkyl, heterocyclic group, cycloalkyl, cycloalkenyl, thiazolinylidenemethyl, thiazolidinylidenemethyl, $-CH=NR_6$ or $-N=C(R_7)R_8$;
R_5, R_{51}, R_{52}, R_{53}, R_{54}, R_{55} and R_{56} each are hydrogen or alkyl;
R_6 is hydrogen, alkyl, hydroxy, alkoxy, carbamoyloxy, thiocarbamoyloxy, ureido or thioureido;
R_7 and R_8 each are independently alkyl, alkoxy, or aryl;
n is 1 or 2;
Z is $-SO_2-$ or -CO-; and
m is 0 or 1;

wherein a cyclic substituent may have one to three substituents selected from the group consisting of nitro, alkoxy, sulfamoyl, substituted- or unsubstituted-amino, acyl, acyloxy, hydroxy, halogen, alkyl, alkynyl, carboxy, alkoxycarbonyl, aralkoxycarbonyl, aryloxycarbonyl, mesyloxy, cyano, alkenyloxy, hydroxyalkyl, trifluoromethyl, alkylthio, $-N=PPh_3$, oxo, thioxo, hydroxyimino, alkoxyimino, phenyl and alkylenedioxy.

2. The PGD_2 antagonist of claim 1 wherein the active ingredient is a compound of the formula (I) wherein



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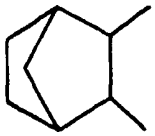
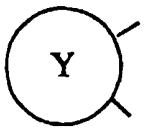


;

m is 0; and when Z is SO_2, both X_1 and X_2 are a single bond; X_3 is alkyl, phenyl, naphthyl, stylyl, quinolyl or thienyl; and a cyclic substituent among these substituents optionally has one to three substituents selected from the group consisting of nitro, alkoxy, substituted- or unsubstituted-amino, halogen, alkyl and hydroxyalkyl, or a salt or hydrate thereof.

3. The PGD_2 antagonist of claim 1 wherein the active ingredient is a compound of the formula (I) wherein



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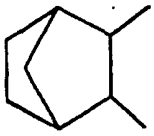
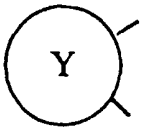


;

when m is 1, both X_1 and X_2 are a single bond; and X_3 is phenyl optionally substituted with halogen, or a salt or hydrate thereof.

4. The PGD_2 antagonist of claim 1 wherein the active ingredient is a compound of the formula (I) wherein



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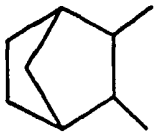
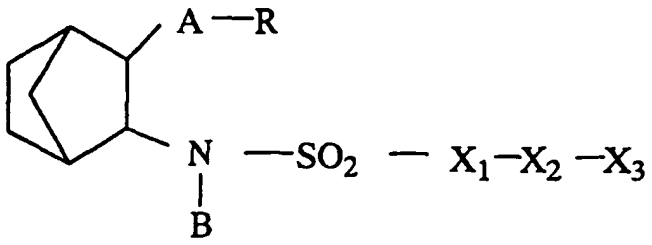


;

when m is 1, X_1 is phenyl, X_2 is $-CH_2-$ or -N=N- and X_3 is phenyl, or a salt or hydrate thereof.

5. The PGD_2 antagonist of claim 1 which is a drug for treating nasal occulsion.

6. A compound of the formula (Ia):



(Ia)

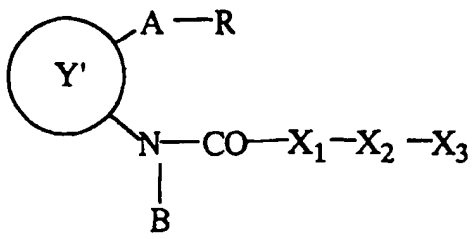
wherein A, B, R, X_1, X_2 and X_3 are as defined above, or a salt or hydrate thereof, provided that those wherein (1) X_1 and X_2 are a single bond, and X_3 is substituted- or unsubstituted-phenyl, or naphthyl; and (2) A is 5-heptenylene, R is $COOR_1$ (R_1 is hydrogen or methyl), X_1 is 1,4-phenylene, X_2 is a single bond, and X_3 is phenyl are excluded.

7. The compound of claim 6, a salt or hydrate thereof, wherein X_1 and X_2 are a single bond, X_3 is isoxazolyl, thiadiazolyl, isothiazolyl, morpholyl, indolyl, benzofuryl, dibenzofuryl, dibenzodioxinyl, benzothienyl, dibenzothienyl, carbazolyl, xanthenyl, phenanthridinyl, dibenzoxepinyl, dibenzothiepinyl, cinnolyl, chromenyl, benzimidazolyl or dihydrobenzothiepinyl, and A, B and R are as defined above.

8. The compound of claim 6, a salt or hydrate thereof, wherein X_1 is a single bond, X_2 is phenylene, X_3 is alkenyl, alkynyl, $-CH=NR_6$ or $-N=C(R_7)R_8$, and A, B, R, R_6, R_7, and R_8 are as defined above.

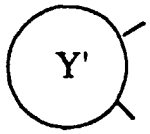
9. The compound of claim 6, a salt or hydrate thereof, wherein R is $COOR_1$, X_1 is phenylene or thiophenediyl, X_2 is a single bond, -N=N-, -CH=CH-, -CONH-, -NHCO- or ethynylene and X_3 is phenyl, thiazolinylidenemethyl, thiazolidinylidenemethyl or thienyl, and A, B, R_1, R_6, R_7, and R_8 are as defined above.

10. A compound of the formula (Ib):



(Ib)

wherein



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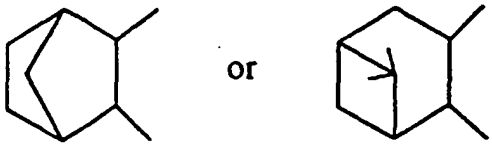
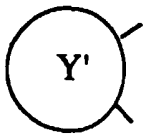


;

A, B, R, X_1, X_2 and X_3 are as defined above, or a salt or hydrate thereof, provided that those wherein X_1 and X_2 are a single bond, and X_3 is phenyl, and wherein X_1 is a single bond, X_2 is -O-, and X_3 is benzyl are excluded.

11. The compound of claim 10, a salt or hydrate thereof, wherein



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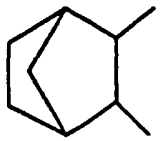


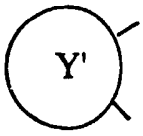
;

and A, B, R, X_1, X_2 and X_3 are as defined above.

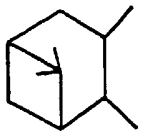
12. The compound of claim 11, a salt or hydrate thereof, wherein R is $COOR_1$ (R_1 is as defined above).

13. The compound of claim 11, a salt or hydrate thereof, wherein X_1 is phenylene or thiophenediyl, X_2 is a single bond, - N=H-, -CH=CH-, ethynylene, -O-, -S-, -CO-, -$CON(R_{55})$- (R_{55} is as defined above), -$N(R_{51})CO$- (R_{51} is as defined above) and X_3 is phenyl or thienyl.

14. The compound of claim 10, a salt or hydrate thereof, wherein



is



,

and A, B, R, X_1, X_2, X_3 and Z are as defined above.

15. The compound of claim 14, a salt or hydrate thereof, wherein B is hydrogen, both X_1 and X_2 are a single bond, X_3 is thienyl, thiazolyl, thiadiazolyl, isothiazolyl, pyrrolyl, pyridyl, benzofuryl, benzimidazolyl, benzothienyl, dibenzofuryl, dibenzothienyl, quinolyl or indolyl.

16. The compound of claim 15, a salt or hydrate thereof, wherein X_1 is phenylene, thiophenediyl, indolediyl or oxazolediyl, X_2 is a single bond, -N=H-, -CH=CH-, ethynylene, - S- or -O-, and X_3 is aryl or heterocyclic group.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP96/01685

A. CLASSIFICATION OF SUBJECT MATTER Int. Cl^6 C07C233/52, 233/84, 271/24, 311/06, 311/11, 311/13, 311/19, C07D493/08, 495/08, A61K31/16, 31/18, 31/27, 31/33, 31/34, 31/35, 31/38
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols) Int. Cl^6 C07C233/52, 233/84, 271/24, 311/06, 311/11, 311/13, 311/19, C07D493/08, 495/08, A61K31/16, 31/18, 31/27, 31/33, 31/34, 31/35, 31/38

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
CAS ONLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP, 6-279395, A (Ono Pharmaceutical Co., Ltd.), October 4, 1994 (04. 10. 94) & EP, 608847, A	1 - 16
X	JP, 2-180862, A (Ono Pharmaceutical Co., Ltd.), July 13, 1990 (13. 07. 90) & EP, 312906, A & US, 5168101, A	1 - 16
X	JP, 63-139161, A (Shionogi & Co., Ltd.), June 10, 1988 (10. 06. 88) & EP, 226346, A & US, 4861913, A & US, 4960909, A & US, 4976891, A & US, 5041635, A & US, 5043451, A & US, 5043456, A	1 - 16
X	JP, 60-178876, A (E.R. Squibb & Sons, Inc.), September 12, 1985 (12. 09. 85) & EP, 150709, A & US, 4526901, A	1 - 16

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
September 13, 1996 (13. 09. 96)	September 24, 1996 (24. 09. 96)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)